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HIS MAJESTY'S PRINTERS,
EAST HARDING STREET, E.C.

THE

PRACTITIONER

A Medical Journal.

JULY–DECEMBER, 1906.

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THE PRACTITIONER.

JULY, 1906.

THE TREATMENT OF SLEEPLESSNESS.

By SIR WILLIAM BROADBENT, Bart., K.C.V.O., M.D., F.R.S.,
Physician in Ordinary to H.M. the King.

In this article it is proposed to consider sleeplessness when it is the special affection for which relief is sought, and is the chief, if not the only, symptom of which the patient complains; not when it is an incident of disease of the nervous system, or of acute febrile affections, or the result of pain or local irritation.

The danger attending the employment of opiates, or hypnotics, or sedatives, arises when persistent sleeplessness, with the depression, weariness, and irritability to which it gives rise, seems to be the only deviation from health, and no obvious cause is recognisable. The patience both of the sufferer and of the doctor is apt to be worn out, and the path of least resistance is to give some sedative. The patient is relieved and the doctor gets credit. The temptation to repeat the dose is almost irresistible, the patient expects and becomes dependent on it. But recourse to hypnotics is not justified by using the word insomnia in the place of sleeplessness, or by employing the latest new drug.

There is a continual production of new hypnotics which argues a considerable demand. It may be supposed to argue also that, one after another, the vaunted remedies are found out, and that the ideal hypnotic has yet to be discovered. It is not reasonable, however, to expect that any particular remedy for sleeplessness will be of universal application.

Opium with its derivatives is of course the most powerful narcotic of any, and is one of the most valuable and important medicaments placed at the service of mankind.

The class which embraces chloral, sulphonal, trional, veronal, is extremely interesting from the fact that their hypnotic action was inferred from their chemical constitution, and that the later members of the group were constructed on definite

theoretical principles with the object of obviating objectionable effects met with in the administration of the others. If we knew exactly the relation between the constitution of these substances and the chemical reactions which take place between the blood and the cortical nerve cells to which their soporific influence was due, a very important pharmacological and physiological advance would be made.

It would be still more interesting, if we understood in virtue of what chemical process morphine produces its effects. It must be fundamentally different from that by which the chloral group acts. The latter are present in some sensible amount in the blood, and probably intercept the free transmission of oxygen from the red corpuscles to the cortical cell elements. The former exists in such incalculably minute proportion that it must interfere with the molecular changes in the nerve cells themselves, by which afferent impressions are registered in consciousness as sensations. These we must assume to be anabolic in character. If we further reflect that the effect of morphia must be quantitatively as well as qualitatively related to the chemical changes by means of which the nervous phenomena which it inhibits are manifested, some idea may be formed of the infinitesimal molecular and chemical changes attending nervous activity.

From the early experiments made with the object of ascertaining the physiological concomitants of sleep, it was concluded that sleep was due to anæmia of the cerebral cortex, attributed to contraction of the arterioles of the pia. The meninges were found to be pale during sleep; flushed with blood at the moment of waking. We are now told that these arterioles have no sympathetic fibres, though such fibres have apparently been demonstrated by Dr. Alexander Morison, and that the intra-cranial blood pressure is regulated by the abdominal circulation. Morphia, however, is still given as a preparation for operations on the brain to obviate hæmorrhage, and whatever view may be taken, we may legitimately conclude that cortical anæmia is a part of the physiological process concerned in sleep; its cause has still to be sought. The blood vessels are the servants of the structures to which they are distributed, and the blood supply is regulated in obedience to the tissue demands. Apparently it is some

product of nerve and muscle activity which is the immediate cause of sleep, inhibiting the chemical interchange between the nervous structures and the blood. To this the shutting off of the blood supply will contribute.

It thus probably remains true that cortical anæmia is a necessary incident of sleep, and we know that conditions of the circulation favour or hinder sleep.

There are good sleepers and bad sleepers; light sleepers, disturbed by the least light or sound; heavy sleepers, who rest calmly through a thunderstorm. Some fortunate people fall asleep almost as soon as the head rests on the pillow every night; others, less fortunate, must woo sleep patiently.

The quality of sleep also varies. The neurasthenic wakes tired after a long night's rest; the after-dinner sleep of undue repletion is unrefreshing, and sometimes stupefying. On the other hand, a brief nap may dismiss at once the fatigue and languor of a busy man.

It is often said that old people seem to need very little sleep, and it is true that they often get very little; but, as Sir Samuel Wilks says in his charming little essay, *De Senectute*, the second childhood is like the first in regard both to food and sleep. The broken sleep of advancing years is due to cardio-vascular changes, or to functional derangements of one kind or another.

Undue heat of the air of a bedroom, or excessive warmth of the bed, or, on the other hand, imperfect protection against external cold, are illustrations of interference with sleep through an influence on the circulation.

When cold feet interfere with sleep, it is not merely through the feeling of cold as such, but by an influence on the general and cerebral circulation. Coldness of the feet, indeed, is often a concomitant of sleeplessness, rather than its cause, and an incident of general vaso-motor disturbance, which may be a gastro-intestinal reflex. When the feet are cold after hard brain work the blood seems to be positively shut off from the feet. A hot bottle is then often of no use, and the best way of warming the feet and procuring sleep is to stand in cold water, and then rub the feet dry with a rough towel.

Emotional sleeplessness need only be briefly alluded to. The greatest foe of sleep is, perhaps, terror; suspense and

anxiety come next. Speaking generally, emotional excitement, relating to the future and to action, is a greater cause of wakefulness than grief and regret for the past. Grief, however, often gives rise to protracted sleeplessness indirectly; it affects the digestion, and then dyspepsia interferes with sleep.

Sleeplessness is one of the terrors of heart disease, in consequence of the interference with the cerebral circulation.

In the prevention and cure of sleeplessness, the object of treatment should be the removal of the obstacle to sleep, not simply to compel sleep, while leaving the disturbing influence in operation, perhaps to do harm in other ways.

When sleeplessness is due to pain, we give opium or morphia to relieve the pain; sleep follows, but it is not to induce but to permit sleep that we administer the opiate. When, again, there is itching or smarting of the skin, we apply a salve or lotion; we do not try to compel sleep by sedatives in spite of it. It is just as unreasonable to control by sedatives the sleeplessness caused by irritation of the internal mucous surfaces. Attention is called to irritation of the respiratory tract by cough and by the sensation which seems to provoke it, but there may be no consciousness of irritation in the digestive tract which absolutely forbids sleep. In high fever, cold sponging or bathing is often a better remedy for restlessness than any hypnotic. A patient suffering from delirium tremens, with its persistent and obstinate wakefulness, may be at once sent into a sound sleep by vigorous cold affusion, even when full doses of hypodermic morphia or hyoscine seem to have no effect.

Some of the most obscure causes of sleeplessness may now be enumerated. One is high arterial tension. High blood pressure is not by any means invariably attended with sleeplessness, but it is a contributory cause of the sleeplessness of old age, of arterial degeneration, and of renal disease. The blood pressure overcomes the resistance in the cerebral arterioles, and maintains an active blood supply to the cortex, which is inconsistent with sleep. When no other cause of habitual difficulty and delay in going to sleep can be found, and the pulse tension is high, the possibility that this is the cause must be entertained.

A characteristic of this form of sleeplessness is the impos-

sibility of getting off to sleep. In such cases a dose of calomel is usually the best remedy, and the patient, who has had a calomel and colocynth pill, will often ask what powerful opiate has been given. It is interesting to remark that the sleep is obtained at once, while the aperient action only takes effect in the morning. By milder mercurial aperients, every other night or twice a week, the arterial tension may be kept down, and sleep obtained indefinitely, but where high pressure in the arterial system has been identified as a cause of insomnia, all the dietetic and eliminant measures, by means of which the blood pressure is reduced, must be put in operation.

Chloral has a specially favourable hypnotic influence when the blood pressure is high, as it relaxes the peripheral vessels, and it owes much of its credit to its good effects in these cases.

Sleeplessness due to very low blood pressure is less common. Low pulse tension, however, is probably a factor in the sleeplessness of acute febrile diseases, though the main cause is a toxin. The effect of a cold bath, or of tepid or cold sponging in inducing sleep in pyrexia, of whatever kind, must be due to the tonic influence on the cardio-vascular system, and is attended with improvement in the pulse tension.

In neurasthenia, again, the cardio-vascular asthenia is a contributory cause of the sleeplessness which attends this condition.

The special feature of low tension sleeplessness is that the patient is drowsy and will fall asleep in a chair while sitting up, but is wide awake the moment he lies down. After a restless night, he may fall fast asleep while at breakfast or soon after. The atony of the arterioles is such that they oppose no resistance to the effect of gravity ; the cortical capillaries are full when the head is low, empty when it is raised. A similar effect is seen in some forms of heart disease, but produced by venous obstruction rather than by arterial asthenia. Sleep is impossible in the recumbent position, and the worn-out sufferer spends the weary night upright in his chair.

The remedy in low tension sleeplessness is not a narcotic, but a cardio-vascular tonic. Digitalis, or theobromine, or

caffein will be given as well as the particular tonic indicated by the general condition. But very frequently a teacup of strong hot beef-tea will send the patient to sleep at once, or even a cup of tea or coffee, which are generally antagonistic to sleep. Beef-tea is better than milk, as imposing less work on the stomach, and the temperature is a matter of importance; the quantity must be small.

By far the most common cause of sleeplessness, however, is gastro-intestinal derangement, especially when associated with flatulence, and, while distension of any part of the alimentary canal may give rise to dreams and broken rest, or definite wakefulness, it is gastric dyspepsia which gives nightmare, and dilatation of the stomach which produces the most serious and obstinate sleeplessness. Associated with the sleeplessness, there is often a degree of depression, which is not explained by the mere loss of rest, together with irritability, and a tendency to look on the dark side of affairs. One of the first things, therefore, to be done in a case of sleeplessness is to inquire carefully and thoroughly into the state of the digestion, and to make a physical examination of the abdomen. Any derangement which may be discovered must be rectified. One form of sleeplessness is so common in association with dilatation of the stomach as almost to be characteristic. The patient goes to sleep at once on getting into bed, but in one, two, or three hours, wakes up with remarkable punctuality, it may be quietly without obvious discomfort, or with a start or bad dream, or actual nightmare, or with violent palpitation or pain in the region of the heart, or in profuse perspiration. He is at once particularly wide awake, and the brain seems to be preternaturally active. If he has worries they crowd into his mind and are set down as the cause of his wakefulness; if he has no definite troubles, he invents or goes in search of them. The explanation of the waking up at a given time is that, the stomach not having got rid of its contents, fermentation of the stagnant matters takes place, and after a certain time sufficient gas and acid are produced to put an end to sleep. Sometimes a hungry, sinking feeling is experienced, and some form of nourishment is taken, after which the patient may sleep, and he attributes the waking up to exhaustion. The sleep, however, is due to the displacement

of gas by the food taken, or to the dilution of acrid matters in the stomach. A dry biscuit is often more effectual than liquid nourishment.

It is noteworthy that such patients make no complaint of flatulence, although the stomach resonance may be very extensive and tympanitic, and may invade the chest up to the fifth space or rib. When we are conscious of flatulence, it is not of the presence of gas as such, but of the attempt to get rid of it, or to pass it on by peristalsis.

In such cases the diet must be simplified and the stomach must never be distended. The amount of bread and other farinaceous foods, of green vegetables, and of liquid with meals must be restricted. Water hot or cold being drunk night and morning. One or two tablespoonfuls of brandy or whisky in a claret glass of hot water as the only drink at lunch and dinner will often be useful in dislodging gases.

Treatment will be directed to the prevention of fermentation in the stomach and intestinal canal, for which purpose salol, naphthol, creosote, carbolic acid or sulpho-carbolates may be given, not forgetting calomel or other mercurial, usually a very important part of the remedies.

The sleeplessness due to dilatation of the stomach is so common, and the recognition is of such importance, on account of the depression which may attend it, that one or two cases may be related.

In October, 1903, a gentleman, aged about 50, came to me in a state of great depression and distress, which he attributed to sleeplessness from which he had suffered for many months. Excepting that his life had been an exciting one, there was nothing unfavourable in his habits or antecedents, and he had enjoyed good health. He had spent the summer at his moor in Scotland, taking part in shooting, having, therefore, plenty of exercise and fresh air. Notwithstanding this, he was irritable and miserable, looked on the dark side of everything, all his investments were going wrong, and, though a millionaire, he was a ruined man. His sleep was broken, and he woke up with perspiration streaming off his forehead. He had taken sulphonal, trional, tetronal, &c. He had, notwithstanding his sleeplessness and depression, a fair appetite; could eat his breakfast. The bowels acted, but probably imperfectly.

He was stout and had a good colour. The pulse was 64; the artery rather large and full between the beats, which were rather weak. Heart normal. Abdomen normal, except that the stomach resonance was unduly extensive and its upper margin high, while splashing was very distinct.

The tetronal which he was taking was forbidden; he was put on a suitable diet, and the treatment was begun by a calomel, ipecacuanha, and colocynth pill every second or third night, and a mixture containing sulpho-carbolate and carbonate of soda and carbolic acid with carminatives.

There were occasional good nights from the first, especially after the calomel pill. The perspiration of the head ceased; the pulse became stronger and of normal frequency, 72, and, with slight vicissitudes, there was improvement week by week, so that in a month he had regained his cheerfulness and confidence in himself, and had only occasional bad nights. At Christmas, after eating some American oysters, he had copious vomiting and diarrhœa, followed again by sleeplessness for a time, but without depression.

Another patient, aged 41, consulted me about the same time on his way home from Carlsbad, where he had been sent for derangement of the liver. He was no better for the course of treatment there, and with the characteristic disturbance of sleep which I have described, the waking up at a given hour, he had lost all interest in his family and in politics, lived in a sort of dream of distrust and terror, was liable to panic, and had all sorts of local apprehensions. The abdomen was tense, and the dilatation of the stomach very great, the upper line of resonance running along the fifth space to the base of the ensiform. The pulse tension was unduly high and the aortic second sound accentuated.

Under treatment, directed to the relief of the affection of the stomach, sleep and mental equilibrium were gradually regained.

Both these patients remain well.

While insisting on the necessity of careful and persevering inquiry as to all possible causes of sleeplessness before resorting to hypnotic drugs, it is of course admitted that there are cases in which these remedies may be necessary.

In old people, vascular degeneration may have gone so far that no physiological state of the cerebral circulation conducing

to sleep may be attainable; or functional derangements, destructive of sleep, may be due to structural changes which cannot be modified, or a condition of restlessness, best characterised by the term "fidgets," without any recognisable cause, may have been established. In such cases we need not hesitate, when all palliative expedients have been tried, to give some sedative. There is no serious danger of the opium or other drug habit being established late in life, and a moderate dose of one or other of the preparations of opium may not only conduce to the comfort and happiness of the patient, but may prolong life. It is, perhaps, in those who, in growing old, have become thin that the best results are seen, and it may be worth remembering that in senile gangrene and irritable ulcer opium may apparently affect nutrition favourably and tend to arrest the disease.

In old age, remedies of the chloral group are less to be relied upon than opium, and a drachm or two of T^2. Camph. Co., or a grain of opium with sufficient colocynth and hyoscyamus to prevent constipation, may be given every night.

In the young, and especially when there is impatience of slight interference with sleep and intolerance of discomforts, an excitable neurotic character, or tendency to self-indulgence, great caution will be necessary and it ought not to be in the power of the patient to obtain sedatives at will, particularly in a concentrated form. Such preparations of sulphonal, trional, veronal, etc., are doing incalculable harm.

When the sleepless habit has been established by nursing, or by continuous anxiety, or disappointment, or loss of fortune, sleep may be procured for three or four nights from time to time by one or other of the chloral group with a view of breaking the habit, or, if there is reason to distrust the patient's self-control, paraldehyde be substituted, as it is nasty and is betrayed by its odour in the breath. It is well to avoid opium.

There are in addition occasions of very various kinds on which the medical man can conscientiously obviate sleeplessness by such drugs as are found to be most efficacious in the particular case, and pain at any age, when the cause cannot be removed, justifies the employment of anodynes.

THE DISTRIBUTION AND TREATMENT OF EPITHELIOMA OF THE LOWER LIP.

By G. LENTHAL CHEATLE, C.B., F.R.C.S.,
Surgeon to King's College Hospital.

[With Plates I.—III.]

THERE can be no doubt that the area of the lips, occupied by the squamous epithelioma in Fig. 4, is the eventual area of spread taken by the primary growth of cancer when it begins on the lower lip. And, with definite additions, the same area is occupied by the primary growth when cancer begins in the upper lip or at the angle of the mouth. All this I have already pointed out in the *British Medical Journal* (April 18, December 12, 1903, and April 29, 1904), in which it will be seen that I regard the limitation to these regions to be due to trophic rather than to mechanical causes; an opinion which is supported by the facts that leucodermia, sclerodermia, herpes, febrilis and zoster, and certain infective processes, rodent ulcers, are also occupants of the same definite areas.

In this article, squamous epithelioma, as it affects the lower lip, will be described, and in connection therewith new methods of excising cancer of this part will be demonstrated. The main points of these depend upon the principle of making incisions which are directed from the cancer instead of towards it as is now practised in the V-shaped method of incisions.

1. Figs. 1, 2, 3 and 4 show different cases in the different stages of the gradual occupation of squamous epitheliomata of this region. When the parts affected are first reached by the cancer can never in any case be exactly known clinically, for this stage can be only discovered by a microscopical examination. But the knowledge that this is the direction of spread renders valuable aid, in the most practical manner, to dealing with cancer of this region. It may be suggested that the value of this aid, pushed to its ultimate issue, would necessitate the removal, by operation, of the whole of the region seen in Fig. 4, even when the cancer is only the size seen in Fig. 1. I can see the force of the suggestion, but

PLATE I.

Fig. 1.

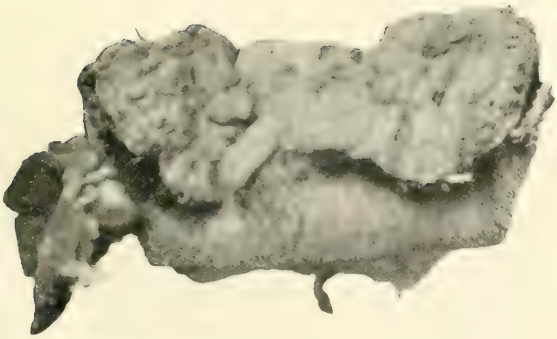

Fig. 2.

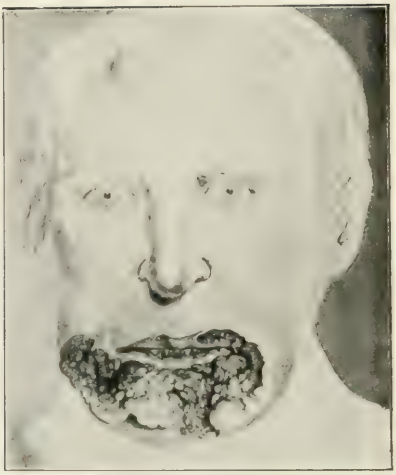

Fig. 3.

Fig. 4.

believe that, when the cancer is small, the effect of the knowledge can be rendered more practicable by a less radical procedure, which I will describe later on.

2. Fig. 5 shows how, almost invariably, the cancer spreads along underneath the mucous membrane, and it may here be mentioned that I have cases which show the squamous epithelioma at first running superficially along the whole length of the lower lip. From this picture, it can be seen that the size of the ulcer can never be trusted to indicate the degree of spread in the parts beneath, and this fact alone negatives the employment of the V-shaped incision which is now universally adopted in the removal of cancer from the lower lip. The incisions are thus made converging towards the cancer, which not only sounds unsafe, but is positively dangerous, as shown by the position of the so-called recurrences, to which I directly attribute the converging lines of the V-shaped incision.

3. The next point is to show how early must be the spread into the buccinator, orbicularis oris, depressor menti, and the depressor anguli oris muscles. Fig. 6 shows the close relationship between the musculature of the lower lip and the skin and mucous membrane. The depressor menti (Fig. 6, E) is farthest away from the skin at its origin from the inferior maxilla.

The striated muscle fibres at their cutaneous insertions can be seen to almost touch the squamous epithelium of the cutis vera, and bundles of fibres can be easily demonstrated among the sebaceous and sweat glands and hair follicles. As the same arrangement exists in the upper lip, the early invasion of the musculature is, therefore, a foregone conclusion when cancer begins in the lip epithelium. The exact period, at which the different parts of the musculature are reached by the growth, can never be clinically obvious, its arrangement, therefore, must be taken into careful consideration in planning operations for the radical removal of cancer.

4. The position, at which the so-called recurrence of cancer of the lip appears, is beneath the skin somewhere between the chin and the lip, generally nearer the lip than the chin, showing that the converging lines of a V-shaped incision either cut across the cancer or left some behind. During

the last four years, I have seen four cases of this so-called recurrence, three of which were practically inoperable. These considerations have led me to eliminate V-shaped incisions from surgical methods for the removal of cancer of the lip. I will now describe the methods I employ to remove it, methods which have been based upon an accurate knowledge of spread of this disease. First, it cannot be too strongly stated, or too often insisted upon, that cancer must be treated immediately it is discovered, also that the successful results of operative interference with cancer depend chiefly upon the knowledge and skill displayed by the operator at the first operation, and that the successful issue of the case does not depend upon a beautiful cosmetic result, for which purpose I believe the V-shaped incision was mainly planned. In all cases of cancer on the tongue and on the lip, in fact, wherever there is malignant ulceration, I cauterise the surface with a suitable cautery, at a dull-red heat, until it is of a leathery consistence. The parts that are being removed should be regarded as a sponge full of cancer, out of which the cells can be squeezed. So during the operation great care is taken not to squeeze the parts, and the ulcer is not allowed to touch the parts from which it is being removed. All these precautions are carried out with the object of preventing transplantation. I believe Wertheim was the first to employ the preliminary precaution of cauterising a cancer ulcer before removing it. I simply apply the principle which he initiated.

It will be seen in Figs. 7 and 8 that the incisions I make are diverging and not converging, as are those of the V-shaped incisions. Whether they are felt enlarged or not, the lymphatic glands are removed either at the same time, or at a second operation. The advantage of operating in two stages is that at the second operation the triangles of the neck are opened in the absence of risk from infection by the micro-organisms of the mouth or surface of the ulcer. If circumstances allow, I operate in two stages, but for the sake of brevity I will describe the details of these operations as if they were done at once. If the cancer is small and begins midway between the angle of the mouth and the middle of the lower lip (*see* Fig. 7), I make two incisions, one external to it and the

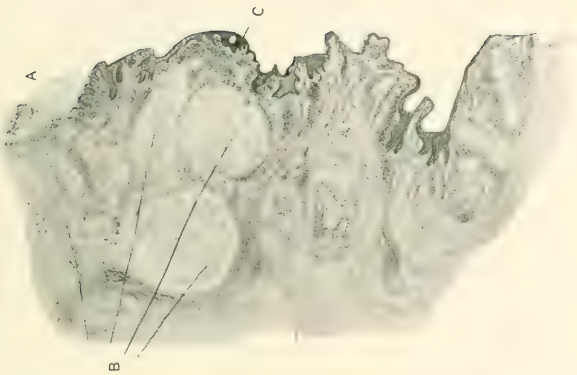

Fig. 5. *A. The edge of a squamous epithelioma ulcer of lower lip.*
B. The cancer spreading beneath the surface of the normal mucous membrane at C.

Fig. 6. *A. Squamous epithelioma of lip.*
B. Mucous membrane of mouth.
C. Attachment depressor labii inferioris to bone.
D. Apex of V-shaped portion of the incision on Figs 7 *and* 8.
E. Depressor labii inferioris.
F. Mucous glands.

other internal. The external incision begins at one-eighth of an inch internal to the angle of the mouth, and is carried downwards and slightly outwards through all the structures of the lip down to bone, as far as the lower margin of the inferior maxilla. The internal incision begins one-eighth of an inch external to the middle line, and is carried downwards and slightly inwards, through all the structures of the lip down to bone, to a point corresponding with the end of the first incision (*see* Fig. 7). The attachments to the jaw of the mucous membrane and muscles between these incisions are cut away as close to the bone as possible (*see* Fig. 6*c*). The ends of these two incisions are united by converging lines which meet at a point midway between the lower margin of the jaw and the hyoid bone (*see* Fig. 7, *B*). The cancerous parts are then removed.

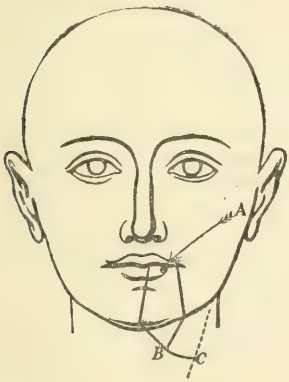

Fig. 7.

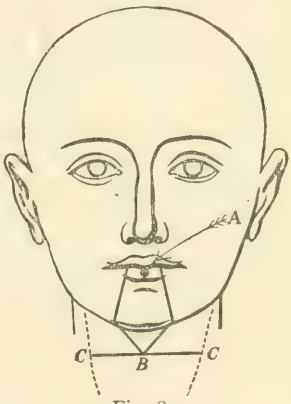

Fig. 8.

A. Squamous epithelioma.
B. Point midway between lower margin of inferior maxilla.
C. Anterior border of sternomastoid muscle.

The lymphatic glands are then dealt with by undercutting the internal flap as far as the submental glands, which are removed. The sub-maxillary and anterior triangle regions are exposed by means of an incision, curved with its convexity downwards, and which starts at *B*, Fig. 7, that is to say, from

the point at which the converging incisions meet, to the anterior border of the sterno-mastoid muscle, *c*, the flap is turned up and the sub-maxillary lymphatic glands are removed, a process which is made easier by the removal of the submaxillary salivary gland with the facial artery and vein. If sufficient room has not been obtained for the efficient removal of lymphatic glands in the anterior triangle, an incision, which extends from the mastoid process to a level of the cricoid cartilage, is made along the anterior border of the sterno-mastoid muscle, Fig. 7*c*. In order to join the lip without tension on the stitches, the internal and external flaps must be freely divided from their attachments to the lower jaw. The parts are then stitched together and two drainage tubes are inserted, one at *B* and the other at *C*.

When a small squamous epithelioma is growing on the middle of the lower lip, the lateral incisions must begin midway between its edge and the angle of the mouth on each side (*see* Fig. 8), and are carried through all structures downwards and slightly outwards to the inferior margin of the lower jaw, and are ended in the same way as those just described in the first operation (*see* Fig. 8), and instead of removing the lymphatic glands from one side, they are removed from both sides by means of incisions similarly planned (*see* Fig. 8).

The resulting deformity is not so great as would be imagined from so extensive a removal of tissues, and, even were it not so, the importance of removing cancer is greater than that of leaving a picturesque appearance.

It will be observed that, in this article, I have dealt with only small cancers of the lower lip. The editor has kindly promised that, in a subsequent article, I may deal with small cancers at the angle of the mouth and upper lip, and finally deal with more extensive but still operable cancers which involve the structures around the lips.

THE CAUSATION AND TREATMENT OF HEADACHES.

(*a*)—INTRODUCTION.

By H. CAMPBELL THOMSON, M.D., F.R.C.P.,

Assistant Physician to the Middlesex Hospital; Physician to the Bolingbroke Hospital, and to the Hospital for Epilepsy and Paralysis, Maida Vale.

NOTHING can be clearer from a perusal of the following articles than the necessity for taking a wide view concerning the causes of headache. When headaches, indistinguishable from one another in character and position, can be shown to be due to such diverse conditions as tumours of the brain, chronic renal disease, errors of refraction, disorders of sinuses, and to toxæmias arising from faulty metabolism as well as to those depending on errors of diet and poisons introduced directly into the system, there can no longer be any excuse for him who sees in every headache only another manifestation of the speciality in which he happens to be particularly interested.

It will also be seen, with few exceptions, how unsafe it is to rely upon the position and character of a headache as a guide to its cause. Dr. James Taylor observes, for instance, that in meningitis the headache may be frontal or occipital, as also it may be when due to a tumour, and Dr. Robert Saundby shows that, in gout and chronic Bright's disease, the pain is also apt to be occipital, while Dr. Lambert Lack finds that all forms and varieties of headache may be met with in connection with disease of the sinuses. Mr. Jessop finds the mid-orbital region to be the most common situation for ocular headache. Then of course the local tenderness and intense nocturnal exacerbations of syphilitic headaches are well known for their diagnostic significance.

It may be said, therefore, that while certain inferences can, in conjunction with other signs, be occasionally drawn from local headaches, no definite conclusions whatever as to the nature and position of a lesion can be arrived at from a headache that is general, and it will be wise to consider even

the local pains as only suggestive, and not conclusive, of the position and nature of the cause, for the pain of a cerebellar tumour may sometimes be chiefly frontal, while that of a growth in the fore part of the brain may be referred to the occiput.

It is, as a rule, comparatively easy to assign the proportionate degree of importance to a headache that is accompanied by other definite symptoms. It is rather when the pain is the most prominent, or the sole complaint that difficulties are likely to arise, for headaches are so common, and so frequently mean nothing more than temporary discomfort, that the occasional unexpected occurrence of a serious causation is apt to be overlooked.

Method in examination, here as elsewhere, is obviously the only safeguard, since, as we have already seen, neither position nor character can be relied upon for diagnosis, and even tumours do not always produce constant headaches, so that no dependency can be placed upon a paroxysmal pain being due to an evanescent cause. It is, however, at the outset of the examination of any case, important to make sure that the complaint is of the nature of a headache in the usual clinical acceptance of the term, and not dependent for instance on some local irritation of the fifth nerve at the base of the brain or elsewhere, the recognition of which may have a very important bearing on the diagnosis.

It would be unpractical to attempt to lay down rules regarding the exact order and method of procedure of examination concerning a symptom, which may depend upon so many different causes, and, where time is of value, the tendency is naturally to look first to what, from the history, or some other reason appears to be the most likely source of the trouble—a method of procedure which is proper and practical, provided it is remembered that the discovery of one possible cause does not necessarily exclude the presence of another of perhaps greater importance. It would be unwise, for instance, to account finally for a headache by a slight error of refraction before the urine had been examined.

So far as the nervous system is concerned, unless the history specially points in that direction, it will usually be sufficient in the first place to examine the optic discs, the

reaction of the pupils, the ocular movements, and the deep reflexes—keeping in mind, among other conditions, the possible existence of intracranial growths, cerebral syphilis, tabes, and general paralysis of the insane—and to follow up this investigation in greater detail if any suspicious signs are elicited.

Examination of the urine will show any kidney trouble, and at this stage it is convenient to bear in mind the possibility of the presence of gout which, as Dr. Saundby shows, may cause headaches closely resembling those of chronic Bright's disease.

In the cardio-vascular system, the state of the arteries must be noted, for a persistent high blood pressure will often give rise to headache, whether it is associated with renal disease or not. Any disease of the heart itself, valvular or otherwise, which is sufficiently advanced to cause headache, either through congestion following tricuspid regurgitation, or through anæmia from aortic disease, will not usually be in danger of escaping notice. It does, however, sometimes happen that a nervous disturbance of the heart accompanies a headache although it is not the cause.

After obvious disease of these larger systems has been excluded, and the eyes have been examined, and the sinuses thought of, we have to fall back upon the causes included under the toxæmias, anæmias, and reflex irritations, between which it is often very difficult to discriminate with accuracy. Some people attribute the causation of all such headaches to errors of refraction, while others blame various articles of diet, but such extreme views are, in my opinion, undoubtedly a mistake, for although it is sometimes easy to fix upon the main cause, the origin of most members of this group is complicated, and successful treatment only results from careful attention to many details, and from taking a broad view of all the circumstances.

It is, for instance, common for a patient of middle age to give a history of attacks of headache from childhood, which formerly occurred about once in six weeks or so, but which have gradually become more frequent, and now take place perhaps once a week, making a considerable portion of life useless and almost unendurable. In most of such instances, whatever the excitants of the actual paroxysm may be, there

is little doubt that the patient has some inherent, possibly inherited, tendency to the attacks, just as others suffer from a gouty or rheumatic diathesis.

Numberless things that would be harmless to ordinary individuals, such as moderate strain of the eye muscles, indigestion, general fatigue, loud noises, and a heated room, may bring on a paroxysm, and in attempting to ward off these for the future, all the likely sources of irritation must be taken into account, just as they should be when dealing with the convulsive seizures of the rickety child, or the epileptic attacks of later life, and a carefully considered method of treatment will usually very appreciably lessen the frequency and intensity of the headaches, though it is rash to promise a cure when the habit has become firmly established over a number of years.

Headaches, attributed to reflex causes, are not very easy to understand, and some that have been placed in this class probably depend upon chemical poisons. The recent communications of Dr. William Russell, some of which have appeared in this journal, in which the existence of reflex arterial spasms under certain conditions is strongly upheld, have some bearing upon this point, since a spasm of intracranial vessels could thus arise reflexly and cause headaches, but the question of vasomotor innervation of the cerebral arteries still remains a matter of doubt, though clinical experience makes it very difficult to believe that these vessels are incapable of active contraction.

Whatever the exact mechanism may be, there seems to be a unanimity of opinion in these papers that vascular variations are at the bottom of most if not all headaches, and since this is to a large extent capable of proof in the case of organic disease, it seems reasonable to infer that the explanation also holds good for such conditions as migraine where the causation is more obscure.

Other headaches, which may be included in the reflex group, arise from continued contraction of the occipito-frontalis muscle consequent to a strong sensory stimulus which may act through the ears, eyes, or other channels of sensation, and it is in this manner that many of the headaches following exposure to strong wind, and some of those associated with toothache and other pains, may be accounted for, always

of course excepting the true neuralgias, which do not come within the scope of these articles.

An important contribution to our knowledge of the causation and treatment of some forms of headache has recently been made by Dr. George Ross,[1] a fuller reference to which will be found in Dr. Wilfred Harris's article. Put briefly, it appears that certain kinds of headaches depend for their causation upon a deficiency in the coagulative power of the blood, and that the subjects who are most apt to suffer in the morning hours are usually those of the "lymphatic" type, characterised by the possession of heavy listless expressions, pale faces and puffy eyelids, and that the deficiency can be counteracted and the symptoms rapidly relieved by the administration of calcium salts of which the lactate seems to be the most efficacious, being less unpalatable and nauseating than the chloride.

(*b*)—HEADACHES OF RENAL ORIGIN.

By ROBERT SAUNDBY, M.D., M.Sc., LL.D., F.R.C.P.,

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HEADACHES are so common with certain people, and are such a frequent symptom of derangement of health of all kinds, that it might be expected they would be observed so frequently as they are in all forms of Bright's disease, but in the later stages of chronic contracting kidney they are more severe, and in this type only have they any characteristic features. The typical renal headache is occipital, for, although patients suffering from renal diseases complain quite as often of pain in the forehead or temples, its localisation there presents nothing special, but occipital headache is rare, so rare indeed that pain in this position points with some significance to the presence of chronic Bright's disease, at the same time we should hesitate to jump to this conclusion.

As is well known, headaches are frequently met with in

[1] *Lancet*, January 20, 1906.

gouty persons, and this frequency is not diminished when gout is accompanied by albuminuria, yet even when the headache in gouty albuminuria is occipital, Bright's disease may be absent.

The following case illustrates this point:—Mr. A. W., aged 52, complaining of vertical and occipital headaches, was seen by me in March, 1903. He was a stout man, weighing 16 st. 9 lb., and had had several attacks of regular gout. There was some œdema of both legs, and his urine contained albumen and sugar, but no casts. He complained of being very drowsy, and had lost consciousness more than once when coughing or laughing. He was a free liver, taking largely of food and alcohol, but he was anxious to get well, and cheerfully followed a careful regimen. At the end of a year he weighed only 13 st. 2 lb., his headaches had disappeared, and the urine contained only a haze of albumen and no sugar. A year later, he came complaining of a return of the headache after having been to a point-to-point steeplechase, where he had been induced to drink wine, which was evidently the immediate exciting cause of the headache. Among my recent cases, there is another example of occipital headache associated with gout in a man, aged 51, whose urine contained albumen but no casts, and who used to drink ten or twelve glasses of beer a day, for which he had lately substituted three or four glasses of whisky! A lady, aged 42, with occipital headache and a gouty family history, had no albumen in the urine, and denied taking alcohol, and although I had my doubts, I was not able to obtain any evidence to the contrary. I have seen a case of occipital headache in a young man, aged 28, who formerly suffered from frontal and occipital pains with nausea, but carefully corrected glasses removed the frontal headaches while the occipital headaches remained. There was no albumen in the urine, nor any evidence of gout in himself, or in his family; the fundi of both eyes were normal; he was quite well on Sundays and holidays, and the probable cause of his headaches was some error of refraction, which the ophthalmologist had not been able to relieve by glasses.

The typical renal headache depends upon uræmia, or at least is associated with other phenomena which we are accustomed to speak of as uræmic, and, like that condition,

is more amenable to treatment, when it occurs in acute or sub-acute attacks of nephritis, which tend to recovery sooner than in those terminal states of chronic Bright's disease in which it is often seen along with albuminuric retinitis. A young man of 18 was playing football on the afternoon of the day before Christmas Day in 1904, when he suddenly went blind, or, as he expressed it, "everything went black." After a time he was able to see a little so that he could count fingers at half a metre. When examined, he had extensive neuro-retinitis in both eyes and suffered from severe headache. He died five months after the sudden loss of sight.

The treatment of renal headache must be that of Bright's disease, but the symptom formally indicates the need for light non-nitrogenous diet, purging, and vapour baths. The occasional improvement of the headache after an accidental haemorrhage, to which these cases are prone, has suggested the value of bleeding. I have seen relief afforded by it, but not for long, the pain recurring after a few days. A simple remedy, which rarely fails to give temporary relief, is the effervescent powder of phenacetin and caffeine of the British Pharmaceutical Conference, but it may need the addition of five or more grains of phenacetin to each dose of the powder. Trinitrin may relieve, but its effects are transient and uncertain, while the more active Erythrolnitrate is more apt to cause than to cure headache.

(*c*).—INTRACRANIAL DISEASE AS A CAUSE OF HEADACHE.

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THERE are several characteristics of the headache incidental to intracranial disease which are common to the headaches, no matter what the character of the intracranial disease may be. The headache is nearly always *paroxysmal* in character. It is true that more or less dull aching may

be present almost constantly, yet severe, even agonizing paroxysms arise at different times and with varying frequency. The paroxysmal character probably depends to a large extent, at least, on variations in the blood pressure, and this is probably the reason why the taking of food, and especially the administration of alcohol, are so frequently followed by a paroxysm of headache in cases of gross intracranial disease.

The occasional association of *nausea* and even *vomiting* with the headache is another characteristic common to the headache produced by different kinds of intracranial disease. The feeling of nausea may be present without actual vomiting. It is generally said to be independent of food, but while this is actually true, it is also the case that the taking of food seems to be frequently the exciting cause of the nausea, and, although the nausea may be present frequently without sickness, there is no doubt that sickness often supervenes. *Faintness* may also be present in cases of headache from intracranial disease. This faintness is sometimes associated with nausea or vomiting; it is sometimes independent of it. In the former case it is probably a reflex effect of the sickness. In the latter it may be the result of intracranial pressure upon the cardiac centre, or more probably upon the respiratory centre—a severe affection of which so often leads to death. For the sudden death, which so frequently occurs in the course of intracranial disease, is nearly always the immediate result of respiratory paralysis.

Having thus considered in a general way the characteristics of the headache of intracranial disease, it may now be useful to say a few words about the headaches of the different forms of such disease. With reference to meningitis, whether this is tubercular, or basic, or associated with ear disease, the pain in the head is as a rule characterised by its constancy as a general dull aching discomfort varied by its severe paroxysms of perhaps agonising pain, not infrequently accompanied by sickness. In tubercular meningitis the headache is most often frontal; it may, however, be occipital, but even if it is, it is not easy to be sure that such occipital headache has definite value in localising the tuberculous process. Such occipital headache may have with it head retraction—not a very common phenomenon in tuberculous meningitis, and when

this is present inflammation at the base is almost sure to be present, and with it considerable ventricular distension. The subjects of basic meningitis are usually of much too tender an age to give any trustworthy information as to headache, and one can only infer it from the expression of pain and the movements of the hands to the head, and perhaps the movement of the head itself. The headache of the meningitis of ear disease is often frontal, but in this and in other forms of meningitis there may be local tenderness to pressure over the area of the scalp corresponding to the inflamed membranes. Yet, in all these forms of meningitis, it has to be recognised that at first the headache is more severe than it appears to be later, but this is only because in the later stages the delirium and unconsciousness either replace, or mask the pain.

An attack of *hemiplegia* is occasionally associated with severe headache. When this is the case the condition causing the hemiplegia is usually one of hæmorrhage. It is rarely that thrombosis gives rise to headache; even thrombosis in vessels the seat of syphilitic endarteritis rarely does so, although if the latter is, as it occasionally is, associated with meningeal thickening, the headache may be persistent and severe both before and after the hemiplegic attack. Embolic hemiplegia also is not usually associated with headache. So that severe headache in a case of hemiplegia will usually suggest the likelihood of hæmorrhage. The headache in such cases is usually general, and there may be superficial tenderness of the scalp.

The intracranial disease with which headache is mostly and most characteristically associated is *tumour*. In any form of intracranial growth, and in growth in any position inside the skull, headache is probably the most constant symptom. The association of headache, vomiting and optic neuritis is regarded as almost pathognomonic of intracranial tumour, and yet it must always be remembered that just as vomiting and optic neuritis may be absent in this disease, so also headache may be practically non-existent, especially if the tumour is a slowly growing one.

Headache, when it is present in intracranial growth, may be frontal, or occipital, or vertical. Frontal pain is probably the most common, but vertical headache is also frequently

complained of. Occipital headache when it is present is frequently associated with pain in the neck, and it rarely exists without the presence of frontal headache as well. It is not easy to determine the localising value to be attached to such headache, and it must be recognised that, besides the headache of any particular character, there may be a spot, or spots at which local pain is present. Head has drawn attention to the co-existence of this local pain with tenderness on deep pressure, and has contrasted it with the superficial tenderness and referred pain which are found in other cases. In the former cases he is of opinion that the local pain and deep tenderness indicate some meningeal affection in the region of the tender part, whereas in the latter the superficial tenderness and referred pain are merely the result of the raised intracranial pressure. Such a view is probably correct, but when it is recognised how frequent—almost constant—is the rise in intracranial pressure in cases of intracranial growth, no matter where the growth is situated, and how difficult it is, indeed almost unjustifiable, to examine for deep tenderness when pain is so severe and so distressing, it must be confessed that head pain in intracranial growth is of comparatively little help in localisation. In frontal tumour, especially if it is superficial, the general headache, with perhaps pain localised at one spot, may indicate the site of the lesion; yet in cerebellar tumour also the pain is often general, probably the result of raised intracranial pressure. If the pain is occipital, especially if there is some head retraction, and the other signs of tumour are present, then the likelihood of a cerebellar, or basal tumour is great. It is evident that, although a careful investigation of the character of the headache and of the presence or absence of local pain and deep tenderness should in every case be made, the character of the headache itself will not often be more than suggestive in determining the site of the intracranial lesion.

A few words may be said as to the treatment of these varied headaches.

The headache of hemiplegia is often much relieved by the use of leeches. It is also well to have recourse to such drugs as bromide and antipyrin in combination. Nitroglycerine also seems to do good in some cases, and it is obvious that

the relief given by such drugs is by lowering the blood pressure.

In meningitis the ice-bag is often a source of great relief, while drugs are for the most part inefficacious. In intracranial tumours, antipyrin, phenacetin with caffein, aspirin and similar drugs often give great relief. In all these intracranial conditions, recourse must occasionally be had to morphia. If it is used, it should be with the full knowledge of its danger—the danger of so reducing the vitality of the already hampered respiratory centre as to possibly induce a fatal result. But even this danger must occasionally be faced in order to relieve the agonising paroxysm which may actually drive a patient to self-destruction. Sometimes also it will be necessary to consider the possible necessity of trephining for the relief of the headache and intracranial tumour. Doubtless such an operation, if combined with opening of the *dura mater*, does in many cases afford relief. In other cases apparently it does not. Yet it may be desirable to have recourse to it in cases incapable of relief by other means, even if it has been decided that the tumour is in such a position, or of such a nature, as not to be removable.

(*d*)—MIGRAINE AND TOXÆMIC HEADACHES.

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MIGRAINE, or megrim, is a term often somewhat loosely employed to designate any form of sick headache, or bilious headache. The word is of Greek derivation, hemicrania meaning half the head; the distribution of the pain in the head being limited to one side in a typical case. True migraine is a paroxysmal headache, occurring at varying intervals, sometimes every month, or at much longer and irregular intervals, but sometimes increasing in frequency until not a week passes without one or more attacks.

ÆTIOLOGY.—Migraine is strongly hereditary, and in a large number of instances a very close relationship can be

traced between it and some other paroxysmal neuroses, notably epilepsy, asthma, and vasomotor angina. The recurrent headaches often commence in early childhood and last throughout life, usually diminishing in frequency and severity after middle life, unless some additional factor such as arterio-sclerosis, or chronic renal disease supervenes, when the migrainous attacks may become more severe and frequent. Both sexes suffer from the complaint, but it is rather more common in women, and it is apt to be especially troublesome at or about the commencement of the period. It has been asserted that it is especially liable to affect persons of brilliant genius, or of more than ordinary keen intelligence, but I cannot say that I have been struck with this in my experience. Certainly it is those families with hereditary liability to nervous ailments that are likely to provide the sufferers from this complaint, but they may be dull-witted, epileptic, or neurasthenic; or, on the other hand, quick, active-brained, nervous individuals, never content to rest quietly, but who must always be about doing something. Many sufferers, as is likely with such a common complaint, are to be found amongst those who have succeeded beyond the average in life's competition; but it is also by no means uncommon amongst hospital out-patients of no more and often of less than average intelligence. Trousseau said that migraine and gout are sisters; and it is undoubtedly true that when gout supervenes in middle life in a migrainous subject, the periodic headaches often disappear. This is probably due to the effect produced by the intercurrent disease, producing febrile attacks, for a similar freedom from migraine is seen in all intercurrent periods of pyrexia, whether due to typhoid, rapidly developing phthisis, or chronic suppuration.

It has often been asserted that ocular defects, such as errors of refraction or defective power of convergence, are at the bottom of the large majority of persistent or periodic headaches. It is undoubtedly the fact that a certain number of cases have been cured by correcting the hypermetropia, or astigmatism present by means of appropriate glasses, or by the wearing of prisms for defective convergence. I have seen a case of very severe migraine develop for the first time at 25, as the result of a painful spreading corneal ulcer, which was

followed by considerable opacity of the cornea. It is undoubtedly true that many forms of headache may be due to ocular defects ; but that true migraine is commonly due to this cause will only be believed by that class of biassed observers, who also assert, with equal conviction, that the majority of cases of epilepsy are thus produced. I have known periodic sick headache, limited to one half of the head, follow a severe concussion in which the base of the skull was fractured. In this case the man was able to follow his ordinary avocations, except on his headache days. These occurred regularly once a fortnight, prostrating him completely, and were followed after many hours by vomiting. Though these attacks were not preceded by any visual phenomena, they were in other respects indistinguishable from those of genuine migraine. Twelve months later the man died, after a short illness, with delirium and unconsciousness, and at the autopsy a chronic cerebral abscess was found in the frontal lobe on the same side where he had complained of the headaches. Just as epilepsy may follow a blow on the head, or may be dependent on some peripheral irritation such as a scar, so migraine may occasionally be brought about in the same way. Other determining causes may be a thunderstorm, or cold east wind, excessive brain-work, sitting up late at night, hot crowded rooms, and excitement of various kinds.

Symptoms. — The essential feature of migraine is the periodicity of the headache. In typical cases it is limited to one half of the head, in some it is universal, but more commonly situated across the forehead, or eyes, or at the root of the nose. The pain usually begins over one eye, spreading thence over the forehead and side of the head, and may then become general. The pain is often first noticed on waking, perhaps after a sensation of heaviness and lassitude noticed the previous evening. In such a case there may be no visual phenomena, but the pain continues all day, increasing gradually in severity until the evening, when nausea, retching, and vomiting usually conclude the attack. Vomiting is not present in all cases, nor when it occurs does it always bring relief. I have known it regularly precede the headache The pain may vary in character from a dull heavy ache to such severe stabbing and throbbing that it seems to the

sufferer as if something must give way in the head unless relief comes. At the commencement of the attack the face and extremities are usually pale, but, as the headache increases in severity, the pallor may give place to a flush on one side of the head, and the carotid and temporal arteries may be noticed to be pulsating excessively. Some injection of the eyes is not uncommon, and in some cases hæmorrhages have occurred into the conjunctiva, or under the skin of the eyelids or cheek. In other cases epistaxis may occur, and it is worthy of note, with regard to the pathology and treatment of severe migraine, how immediate may be the relief produced by such a profuse letting of blood. As already said, the essential feature of migraine is the periodical recurrence of headache, which may or may not have the typical hemicranial distribution. In many cases however, in addition to the headache, various sensory symptoms are noticed of which the visual phenomena are the most striking and the commonest. These precede the headache and consist of a partial loss of sight, sometimes limited like the headache to one side, producing the symptom known as hemianopia. This partial blindness may come on quite suddenly, so that objects and people's faces seem blurred; if the blindness is hemianopic and the patient looks at her face in the glass, only one half of it will be visible. Just as frequently the dimness of vision is general, and comes on with a sensation of giddiness lasting for about ten minutes. Often objects, such as furniture, seem to be moving, and frequently the patient complains of an appearance of a cloud in front of the eyes, or of black stars falling in front of her. In a few cases the cloud appears luminous, like a fiery ball: this appears to pulsate regularly with the heart beat, slowly increasing in size, until the ball becomes a fiery ring. The ring then opens out into a luminous semicircle, increasing in size until it surrounds, like a rainbow, the periphery of the visual field on one side, with zigzag prismatic colours darting in and out of the fiery zone at irregular angles. This fully developed visual phenomenon is known as the "fortification spectrum" or the "scintillating scotoma." The visual spectrum lasts as a rule not more than about twenty minutes, being succeeded by headache of gradually increasing intensity as

already described. Sometimes the visual phenomena or the hemianopia may occur without the headache following, just as in epilepsy the aura may be frequently felt as a sensation, without a fit occurring afterwards. I have known severe migraine, preceded by hemianopia, to affect a man all his life; whose son never had a sick headache, although on four or five occasions he was affected by the sudden onset of hemianopia, lasting about a quarter of an hour.

Other sensory phenomena not infrequently met with are numbness and tingling of the face and lips and tongue on one side, sometimes spreading to the hand, and even the foot on the same side. There is generally some slight confusion of mind at the commencement of these sudden attacks, and temporary partial aphasia, or inability to say certain words, may accompany the onset. A typical instance was that of a doctor friend of my own, now dead, who had only seven attacks in all, but all of them severe. The first occurred at ten years old; he was sitting at table, when his fork suddenly dropped and he was unable to speak, owing to confusion of words; next a sensation of tingling and numbness spread down the left side of his face, tongue, arm, and leg, which lasted three-quarters of an hour, during which headache came on and he vomited. All the symptoms then passed off except the headache, which lasted two days, the pain being in the left eye and temple. He had six subsequent attacks at long intervals, quite as severe, commencing, according to his own description, with "the ocular symptoms as described in books, followed by numbness of the left side and headache, but no trouble with speech nor vomiting." His last attack occurred at the age of 34, during a written examination. His sister also suffered from migraine, starting at the age of 24, and after a worse attack than usual, with severe pain behind the right ear, permanent left hemianopia resulted, undoubtedly from a vascular lesion in the right cuneus.

A clear understanding of the pathology of migraine is a necessary preliminary to its scientific treatment. Mention has already been made of its close relationship to other paroxysmal neuroses, especially epilepsy, asthma, and vaso-motor angina. Indeed, a typical migraine with hemianopia and the scintillating scotoma may certainly be looked upon

as a sensory epilepsy, with a discharging focus in the neighbourhood of the occipital lobe. Migraine may occasionally co-exist with epilepsy in the same subject, and it is quite common to find epilepsy, severe neuralgia, asthma, chorea, various forms of tic, and other neuroses in near relatives. For example, one case I have met with was that of a woman, æt. 43, who had suffered with typical migraine since childhood, the periodic headaches being limited to one side of the head, not always the same side, and preceded by right hemianopia and a fortification spectrum of dazzling prismatic shapes and colours. She had never had a fit, and knew of no member of the family who had ever had one. Her son suffered from epilepsy; at the age of twelve he had scarlet fever, followed by nephritis, and while convalescing had his first epileptic fit, being unconscious for three hours. Since then he has been subject to frequent fits, about once a fortnight. He sometimes has an aura of vertigo, and is sleepy after the fit, which is immediately followed for some hours by splitting headache on the top and both sides of the head, followed by vomiting and then relief. After some fits, he sees black spots quivering in front of his eyes before the headache begins. Eighteen months after the fits commenced, he began to have attacks in which he felt dizzy and became partially blind, losing the left visual field, in which he saw brilliant prismatic colours; he had only some seven or eight of these attacks. His fits became completely arrested under systematic bromide treatment. Another case, a woman, æt. 42, had suffered ever since childhood from periodic sick headache; soon after waking she would notice pain over the left eye, which spread over the left half of the head, but not preceded by any visual phenomena. Sickness soon followed the headache, but did not relieve it. When 20 years of age she was much frightened by seeing her father drowned before her eyes; that same evening she had a fit lasting some hours, which was thought at the time to be hysterical. The fits have recurred ever since at intervals of two or three years, and are definitely epileptic. Such cases could be multiplied indefinitely by references to the literature, and clearly demonstrate the close association that exists between migraine and epilepsy, notwithstanding the strong

opposition that is sometimes offered to this view of the disease by intelligent sufferers from the complaint, especially if they are medical men. The site of the headache is probably not constant; it is apparently in some cases peri-cranial, and may be definitely associated with a throbbing temporal and occipital artery on that side. Pressure on these vessels, or the application of an ice-cap to the head on that side, may bring immediate relief, which makes it difficult to resist the conclusion that a vaso-motor disturbance is an essential feature of the morbid process. It is a matter of common knowledge how frequently there is initial pallor of the face and extremities, especially on the side affected, with later throbbing of the carotid and temporal arteries on that side as the headache develops. Though no precise knowledge is obtainable of the actual condition as regards vascular engorgement, or anæmia of the brain cortex during an attack of migraine, it seems rational to suppose that a somewhat similar process is taking place there, as can be seen and demonstrated elsewhere. Though no vaso-constrictor nerve supply can be found to the vessels in the substance of the brain, yet there is undoubtedly such a nerve supply to the meningeal vessels, and possibly to the arteries supplying the cortex of the brain also. A vaso-motor spasm in various territories supplied by these vessels might well produce the initial sensory phenomena so often noticed before the commencement of the headache. It is then easy to understand how such repeated spasm of an artery may occasionally be followed by thrombosis and permanent occlusion of the vessel, such as has been shown may take place in the occipital lobe, causing permanent hemianopia. Succeeding the initial vaso-constriction, it is not improbable that a longer period ensues of vaso-dilatation and engorgement of the meninges and cortex, producing the severe headache. If this view is correct, the immediate relief that may follow a profuse epistaxis, or compression of the carotid artery on the side of the headache is at once explained. Other modes of gaining similar relief depend on withdrawing blood to other parts of the body, as by immersion up to the neck in a hot bath, with a sponge-bag full of pounded ice placed on the head. So long as the patient remains in the bath the headache may be kept at bay, but it is apt to return soon after

leaving the bath. Sipping very hot water or hot tea produces the same effect of causing vascular engorgement of the viscera, by that means lessening the pressure in the cerebral vessels. The frequency of the attacks in women at the commencement of the period is thus explicable by the raising of the blood pressure known to occur at that time; the subsequent loss relieving the pressure and the liability to headache. It is possible that in some cases the condition of vaso-constriction of the meningeal and superficial arterioles may last for some hours; this condition in itself may cause headache, as is seen in the severe persistent headache that may occur in arterio-sclerosis. Again, the headache that is so common in anæmia is the result of deficient blood supply and the consequent œdema of the meninges. This will explain why it is that not all cases of migraine react to the same treatment; some will derive instant relief from compression of the carotid on the side of the pain, or from pressure on the temporal or occipital arteries, or from an ice-cap to the side of the head, by a letting of blood such as epistaxis, by sipping hot liquids, or by sitting in a hot bath; while, on the other hand, others may be relieved by the inhalation of nitrite of amyl, or by a tabloid of nitroglycerin, or by putting their feet in cold water. It is a matter of general knowledge that, when the headache is fully developed, there is no drug that may be relied upon to bring relief, with the exception of a hypodermic injection of morphia. The reason for this is the practically complete arrest of the digestive and absorbent powers of the stomach, so that the drug which has been administered lies inert, and is not absorbed until the headache passes away and the functions of the stomach are recovered. The drug may indeed be vomited unchanged amongst the stomach contents at the conclusion of the attack. That this is the case is shown by the undigested condition of food which has been swallowed shortly before the onset of an attack of migraine, though it may not be rejected until several hours after. Another form of treatment, which is looked at somewhat askance in these days of aseptic surgery, is the wearing of an ordinary tape seton at the back of the neck. This, besides acting as a local counter-irritant, sets up a condition of slight chronic suppuration, and the average evening temperature will be found to

be higher in these cases after the insertion of the seton. It is this production of pyrexia which is probably responsible for the diminution in the frequency of migrainous attacks, a diminution which is seen in other conditions of intercurrent pyrexia, as has already been mentioned. If there is sufficient warning of the threatening attack it is frequently possible to abort it, just as a threatening epileptic attack may be frequently prevented by appropriate treatment, if the aura is sufficiently long.

Patients subject to migraine soon become expert at recognising any prodromal symptoms which give them warning of an oncoming attack, and I have frequently known such attacks to be kept at bay for a considerable period by the timely administration of a full dose of phenacetin and caffein citrate. If the attacks of migraine are really severe, I order 30 grains of phenacetin with 10 grains of caffein citrate to be taken as soon as the aura is felt, and if possible, the patient should lie down and keep as quiet as possible for a couple of hours. In other cases, when the attacks occur as frequently as once a fortnight or oftener, a course of mixed bromides, 10 grains of each three times a day, with a little arsenic, I find the best treatment. For the menstrual headaches I prefer to give butyl chloral hydrate in 10-grain doses, with phenazone five grains, and tincture of gelsemium 15 minims, for two days previously to the date on which the symptoms may be expected, and continued for another two days after the commencement of the period. Some patients react better to antipyrin than to phenacetin, others to acetanilide, or combinations of these with caffein as antikamnia or migrainine, or with ammonium carbonate as ammonol, or again, "pyramidon." For the fully-developed headache, none of these drugs or mixtures will probably have much effect on account of the inability of the stomach to absorb the remedy, and recourse must be had to one or other of the methods of influencing the vaso-motor storm responsible for the symptoms, according to the predominance of vaso-constriction or dilatation of the vessels. Sometimes massage to the forehead and head, combined with the administration of high-frequency electricity in the form of faint sparks to the scalp, may considerably ameliorate the headache. High-frequency currents lower blood pressure, and might

therefore be expected to be more efficacious than static electricity, administered as the negative breeze for the headache of migraine. Yet, in spite of the general tendency of static electricity to raise blood pressure, the local effects upon the head and scalp produced by administering the negative breeze from a well-made and powerful machine more than compensate for this, and the effect on the headache may be immediate and lasting.

Ophthalmoplegic migraine is a variety of sick headache, the periodic attacks of which are associated with a recurrent paralysis of the third nerve on the same side, so that during the headache and for a varying number of days afterwards, there is nearly complete ptosis, with divergent strabismus, and a fixed and partly dilated pupil. As a rule, the symptoms of third nerve palsy clear up to a large extent by the end of a week after the attack, but there is nearly always some permanent weakness, and as time goes by the paralysis of the eye becomes more and more complete. These attacks, like ordinary migraine, usually commence in childhood, but they do not seem to be accompanied by the visual disturbances so common in the latter. They generally commence with pain in the eye, and I have known one such case in which the pain in the eye became so persistent and severe that the eye was enucleated, after which the attacks of headache completely disappeared. Another case of mine commenced two days after a quantity of salt was thrown into the eye, which caused considerable pain. The actual cause of the palsy of the third nerve is still somewhat obscure, but some cases have been shown to be due to a partial damage of the nerve, either by a patch of meningeal thickening, pressure of an exostosis, etc.

Neurasthenia.—Headache in this disease is one of the most constant symptoms. It is usually vertical, but may be occipital. In the majority of instances the pain is of a dull character, sometimes more of the nature of a pressure than a pain, but it may appear to be acute, the patient complaining of a sensation as though a nail were being driven into the top of the head, the so-called *clavus hystericus*. Another form of neurasthenic headache is a sensation as though the top of the head were opening and shutting. In hysteria likewise similar sensations may be complained of, or the pain may sometimes

be referred along the course of a particular nerve, which may be called neuralgic headache. In the treatment of the headaches of neurasthenia and hysteria, it will be advisable to avoid the use of drugs such as morphia, chloral, phenacetin, antipyrin, and the rest of this class. Treatment must be adopted for the removal of the general neurasthenic condition, and not specially aimed at any one particular symptom. A course of glycerophosphates and ammonium bromide is often of great use both as a nerve sedative and nerve tonic, while strychnine had better be avoided in the early stages of treatment for a bad case of neurasthenia. Rest in bed, isolation, feeding up, massage, and electric baths will be the best way as a rule of attacking such cases.

In *Anæmia*, headache is often a very prominent symptom. It is mostly due to the deficiency of hæmoglobin and the consequent tendency to œdema, which, with the simultaneous starving of the meninges and cortex, cause the headache. This may be vertical, but is usually frontal, and may be referred chiefly to the back of the eyes. It is noteworthy that when the headache of anæmia is very severe, optic neuritis may occasionally supervene, which may cause a wrong diagnosis of cerebral tumour to be made. Such anæmic headache is generally relieved by lying down, whereas in congestive headache the reverse is the case. It appears that in certain persons of lymphatic type, subject to anæmia, chilblains, and chilly extremities, there may be a deficiency of calcium salts in the blood. The headache that results from this condition is due to the consequent wateriness of the blood and increased tendency to œdema of the meninges. The administration of calcium salts has been shown to be of great service in relieving such headaches. The lactate of calcium should be given in doses of 15 to 20 grains three times a day. It is almost tasteless, but dissolves in water with difficulty, not more than 10 grains to the fluid ounce. It will be a matter of personal experience to many, if not to most, that copious libations of intoxicating beverages overnight are liable to be followed in the morning by headache of varying intensity. This has been ascribed to a similar temporary deficiency of calcium salts in the blood, which are precipitated by the organic acids contained in the wine, just as citrates or citric acid will precipitate the calcium

salts in milk or in the blood. This "toper's headache" may be completely and speedily removed by a dose of 20 to 30 grains of lactate of calcium shaken up in a little water.

Congestive headaches include those forms in which the meninges and the brain itself are either the seat of active or passive congestion. In active congestion the vessels may owe their dilatation to the action of a drug, as amyl nitrite or nitro-glycerin, either of which may set up headache. The active congestion of commencing inflammation, such as meningitis and cerebritis, will also be accompanied by severe headache. Passive congestion will be produced by any mechanical hindrance to the return of blood from the intracranial contents, such as a tight collar, or indeed any other cause of partial asphyxia, as breathing the used-up air of crowded rooms.

Reflex pain in the head, often accompanied by areas of superficial tenderness on the scalp, especially the temporal region, has been shown by Dr. Head to be indicative in many cases of organic disease of the various viscera. According to the area of skin on the scalp, temporal, vertical or occipital, which is the seat of this superficial tenderness to a light touch with a pin, he has been able to differentiate between disease affecting the pleura, diaphragm, liver, stomach, ovary, etc. Headache, usually frontal, is not uncommon in acute and chronic gastritis, especially when constipation is present. It is important to distinguish a true migrainous attack with vomiting from the headache, partly reflex and partly toxic, of a primary gastric derangement. In the former there will be a history of periodic headache, which may be preceded by sensory symptoms such as the visual spectra already described, and the nausea, retching, and vomiting come on usually after the headache has lasted some hours; the tongue too in migraine will be clean, and the gastric pain will be slight. In the headache of gastric disorder, the pain and indigestion are primary, the tongue is usually furred and the breath heavy, the bowels confined, and there may be a history of chronic indigestion. Mistakes are not likely to occur except in the few cases of migraine when the vomiting occurs early, or even precedes the headache, and again in those cases of migraine when the exciting cause is clearly an indiscretion in diet. Some subjects of migraine are liable to an attack after any

heavy meal, especially if taken late in the evening, in others certain particular articles of diet may precipitate an attack; these they learn by experience to avoid.

In tabes, diabetes, and in syringomyelia, persistent pain may be felt at the back of the head. The diagnosis of these causes will depend on the routine examination of the nervous system and the urine. Mention may be made here of the importance of examining the skull and scalp, nose, eyes and ears in all cases of persistent or recurrent headache before coming to the conclusion that the symptoms are due to a neurosis or other functional cause. The headaches due to renal causes are treated in a separate article.

Rheumatic headache is a pericranial pain due to a fibrositis of the aponeurosis of the occipito-frontalis muscle, the pain and tenderness being felt more especially at the insertion of these muscles at the top of the forehead and occiput. It is generally due to direct exposure to cold, and will be best relieved by warm applications to the scalp, and aspirin in ten grain doses.

Neuralgic pains may also be set up along the course of a nerve or nerves to the scalp by exposure to cold, such as a cold north-east wind, one effect of which is to cause a painful sensation as of a tight band across the forehead and root of the nose. Abnormal electrical states of the atmosphere may also produce headache in certain people.

Toxæmic headache may be due to the administration of drugs, as alcohol, iron, or nitroglycerin, or the toxæmia may be dependent on an acute infective process as typhoid, pneumonia, malaria, or influenza. Thirdly, the condition may be one of faulty metabolism, due to organic disease of the liver, as alcoholic cirrhosis, or to a functional derangement of the liver. The headache that is so common a feature in gouty conditions is perhaps partly due to deranged liver action, by which the purins and other uric acid antecedents are permitted to circulate in the blood, and partly to a faulty diet containing an excess of these bodies.

Alcohol, when taken in excess, has already been mentioned as causing severe headache, which is possibly due to precipitation of lime salts from the blood by the organic acids in the wine. This may be quickly relieved by the administration of

twenty grains of lactate of calcium. In chronic alcoholism severe and persistent headache across the forehead and top of the head is an occasional symptom. This is due in some instances to chronic meningitis, but in the majority it is secondary to chronic gastritis and cirrhosis of the liver, other symptoms of which will be present.

Iron, especially the stronger preparations as the perchloride, sometimes gives rise to headache as well as to gastric pain. Some anæmic patients are extremely susceptible to iron, and great difficulty is sometimes experienced in their treatment. The vegetable preparations are the best borne, and an important point is to dilute the mixture well with water, half a tumblerful or more of water being given with each dose, which should always be taken soon after a meal, never on an empty stomach.

Nitroglycerin sometimes causes severe throbbing headache, due to the vaso-dilatation and cerebral congestion produced. It should therefore be cautiously administered, beginning with small doses. The same applies to amyl nitrite and erythrol tetranitrate, drugs used in the treatment of angina.

Frontal headache is a very common initial symptom in typhoid and in small-pox, partly toxic, partly congestive. In the early stages of pyæmia, too, headache may be sufficiently prominent as a symptom to give rise to a suspicion of meningitis, or lateral sinus pyæmia. The headache in malaria occurs in the hot stage, is chiefly frontal, and is congestive in origin.

In *Influenza*, the headache may either occur during the early stages of the fever, when the pain is usually across the eyes and back of the head, often most severe and agonizing in character, or it may appear after defervescence, during the stage of intense depression and debility, which is such a characteristic after effect of influenza. For the early headache, aspirin, followed by a mixture containing

Phenazon.	- - -	grs. x.
Caffein. Cit.	- - - -	grs. v.
Ammon. Brom.	- - -	grs. xv.
Aq. Chlorof.	- - - -	ad ʒi. T.d.s.

will be the best treatment. For the later headache, often combined with insomnia, veronal in ten grain doses at night,

and the mixture previously recommended will bring relief in time, but the pain at the back of the head may last for many days. Plenty of fresh air is also essential.

Gouty headache, or "Uric acid headache," as it is sometimes called, is due to a toxæmia associated with faulty metabolism. It appears to be dependent, at least in part, on the circulation in the blood of purins and other uric acid antecedents, derived from a diet containing an excess of these bodies. It is especially animal food that is responsible for the excess of these bodies, though they are also contained in tea and coffee. For persons, especially those of sedentary habits, with large appetites, it will be well in certain cases to insist on a rigid purin-free diet, of milk, eggs, cheese, butter, cream, bread, nuts, macaroni, potatoes and most green vegetables. With occasional blue pill, and laxatives, as two ounces of Apenta water taken hot the first thing in the morning, and a short walk followed by a light breakfast, relief may be obtained from the persistent distracting pain at the top and back of the head which, in men over forty, is especially characteristic of a general excess in proteid diet.

There is a recurrent form of morning headache met with in late middle life, chiefly frontal, and made much worse by the act of stooping which starts a severe throbbing, that is best relieved in some cases by cannabis indica. In others, salicylate of soda and ammonium bromide appear to answer better.

Lastly, in addition to excessive proteid diet, according to Hare, excess of carbohydrate food may give rise to the same symptoms of headache, etc., that are familiarly ascribed to "uric acid." This excess of carbohydrate food material he names "hyperpyræmia," and it may perhaps be taken as an admitted fact that excess of all forms of food, proteid, fat, or carbohydrate is likely to lead to overloading of that important digestive gland the liver, and ultimately the excretory processes and kidneys. Undoubtedly the majority of people eat too much, and many persons, who take little or no exercise, eat as much as a man requires who is doing hard manual labour. To sum up in a nutshell, "Less food and more open windows" will often go a long way towards abolishing a chronic tendency to headache, which has hitherto defied all treatment by drugs.

(*c*)—EYE STRAIN AS A CAUSE OF HEADACHE.

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The acceptation of the fact that eye-strain is a very common and important factor in the causation of headaches and neuralgia in the region of the face and head has been slowly but now generally conceded. When I published my paper in The Practitioner in 1888, the subject had been little treated, but since then numerous papers and even books on the subject have appeared. On again reading my first papers, I find little perhaps to add, except that greater clinical experience makes me still more certain of the constant association of eye-strain and headaches. Many authorities have published cases showing that eye-strain may play an important role in the production of numerous diseases and conditions; amongst others reflex nervous disturbances of all sorts, habit spasm, epilepsy, chorea, melancholia, tachycardia, dyspepsia, chronic constipation. However this may be, it seems much easier to account for headaches and neuralgia about the head than these other diseases, as the eye is supplied with general sensation by the nasal branch of the ophthalmic division of the fifth cranial nerve. Head has shown that the mid orbital region of the skin is intimately connected with the eye. This furnishes one of the proofs that visceral disturbance is associated with pain at certain points on the surface of the body.

Ocular headaches may occur at any age, but patients suffering from them are generally under 20 years of age. The most frequent time of life is between 6 and 10 years; in young girls, the usual age is between 14 and 16; in youths, from 18 to 20. This last result is probably due to the regular life at school keeping a boy in good condition, whilst afterwards the more sedentary life brings out the refraction error previously neutralised by the ciliary muscle. Of course, when presbyopia is beginning to be felt, from 40 to 45 years of age, headaches are prevalent. The headaches may be bilateral, or unilateral; in the latter case, there is frequently a difference in the refraction of the eyes (anisometropia) and the headache

is generally more marked on the same side as the eye with better vision. I quite agree with Dr. Head that the most common situation for ocular headache is the mid-orbital region, and that patients, when asked to point with both hands to the position of the headache, generally place their fingers over the centre of each eyebrow. Temporal, vertical, occipital, and even cervical headaches are, however, frequently met with caused by eye-strain. I am of opinion that the mid-orbital headache is the more easily cured by glasses, and indicates less severe strain than the other forms. Patients with these headaches often complain of pain at the back of the eyes, and are frequently the subjects of migraine complete, or partial.

These eye-strain headaches are caused, as a rule, by (1) errors of refraction and accommodation, (2) disturbance of the extrinsic ocular muscles, especially those associated with the convergence power, and (3) impaired vision from inflammatory, or other changes in the media and coats of the eye, or in affections of the optic nerve. This last class I shall only mention in this paper, and pass on to consider the headaches caused by refraction, accommodation, and convergence errors.

(1) *Refraction.*—Of the errors of refraction, astigmatism is probably the most fertile source of headache. Hypermetropic astigmatism, either simple or compound, being the most common form met with, is responsible for the greatest number. The amount of astigmatism does not apparently bear any proportion to the effect produced, as the smallest amounts $+ \cdot 25$ or $\cdot 5$ are factors as potent as the higher degrees.

Myopic astigmatism, simple or compound, occasions headaches and neuralgias, as does also the most rarely met with form mixed astigmatism.

Hypermetropia is responsible for nearly as much eye strain as astigmatism in patients under forty years of age, and the condition must be corrected for even small amounts. In children hypermetropia is often partially, and may be completely masked by spasm of the ciliary muscle.

It is an important fact to remember that simple myopia is never responsible for headaches or neuralgia; occasionally

high myopia with pathological changes may produce severe headache, but only from the pathological choroido-retinal changes.

Accommodation.—Of accommodation errors eye-strain headaches are often produced by spasm of the accommodation in children and young adults.

Presbyopia is a fertile source of headache after 40 years of age, due to weakening of the power of the ciliary muscle and accommodation.

(2) *Extrinsic Ocular Muscles.*—The most usual extrinsic ocular muscular cause is insufficiency of convergence power, which may be due to congenital defect, to the upset of the relations between convergence and accommodation, or to disturbance of general health as in anæmia.

DIAGNOSIS.—In cases apparently caused by error of refraction, the diagnosis must be chiefly based on the detection of this error, and every care ought to be taken to avoid a mistake especially as in young subjects the ciliary muscle may by contraction even simulate myopia, when the real condition is hypermetropia. It is for this reason that atropine may have to be used to overcome this spasm, but the observer must bear in mind the discomfort arising from its use and order it as little as possible, except in young children. Homatropine and cocaine in cases over 14 years of age as a rule, does perfectly well, and possesses the great advantage that the effects pass off after a few hours in contradistinction to several days in atropine.

As has been stated before, constant headaches in children under 14 years of age may be practically always diagnosed as due to eye-strain from a refraction error, and though the acuity of vision ought to be tried, yet in every case I should order atropine disks, or drops, for at least one or two days, before estimating the refraction by retinoscopy and glasses. By this means any chance of spasm of the ciliary muscle is avoided.

In young patients between 14 and 18 years of age, the eyes should, as a rule, be examined under homatropine and cocaine, drops placed in the eyes twice at intervals of 10 minutes.

In adults, as a rule, fairly accurate results can be obtained

by vision testing without a mydriatic, but even with them, it may be necessary to examine the eyes under homatropine and cocaine. Retinoscopy should in all cases be done.

After using homatropine and cocaine, it is important to put into the conjunctival sac a drop of eserine solution (2 grs. to the oz.) to overcome the dilatation of the pupil.

The complete methods of estimating the refraction are therefore by vision testing and retinoscopy, if necessary with the eyes under a mydriatic, as homatropine and cocaine, or atropine.

I think fewer cases would be overlooked to-day if every practitioner at all events would adopt a rather rough and ready procedure, which I demand of my students, and then, if unacquainted with the treatment of refraction errors, advise the patient to obtain skilled advice. The only things needed are a set of Snellen's Distant Test Types, a room long enough to enable them to be read at 5 or 6 metres distance, good (daylight or artificial) illumination of the types, a convex glass of 1 D and another of ·5 D, and a round white card, or tin plate, with three or four moderately thick black parallel lines on it. The patient is placed at the fixed distance, 5 or 6 metres from the test types, and the vision for each eye is separately noted. The + 1 D glass is now placed in front of each eye separately, and the patient asked if he can see better, the same, or worse. If he answers that the sight is the same, or better, he is hypermetropic; but if on the contrary the answer is worse, then he is tried with + ·5, when, if the same answer is given, he is probably emmetropic, myopic, or astigmatic. The card with the horizontal black lines is then presented at the same distance to each eye separately and rotated slowly round. If the patient sees all the lines in every direction equally plainly, he is not astigmatic, but if in one direction the lines tend to run together, there is astigmatism.

By these simple means the most fertile sources of eye-strain headache, hypermetropia and astigmatism, can as a rule be diagnosed.

If the patient is emmetropic, or has simple myopia, the headaches are not due to refractive error.

The patient's statement of the history of the headaches

often aids the diagnosis; they frequently come on, or are made worse, by doing near work, or through looking for a long time at distant objects, as at the theatre, a cricket match, etc.

Added to these facts, there are generally objective signs to be seen generally known as asthenopic signs. These are a general strained look of the eyes, the eyelids red or pink as to their ciliary margins, white scales about the bases of the lashes, congestion of the conjunctival vessels sometimes even amounting to a "pink eye," in children, folliculosis, phlyctenules, twitching and blinking of the eyelids, styes and even marked ciliary blepharitis. The patients, in addition to the headaches, complain of mistiness of vision, lachrymation, tired feeling in the eyes, etc. Astigmatic children are often thought to be slow in their work and even stupid.

Treatment.—When the refraction has been found to be due to hypermetropia, or astigmatism, glasses must be prescribed, and if properly worn the headache should be cured. Theoretically, in nearly every case the wearing of glasses should be constant, but, in adults, I generally try the intermittent use at first, and only resort to the more stringent treatment, if the headaches persist. I am sure that there is a tendency in the present day to assist Nature too much in the way of splints, glasses, etc.

In young children, glasses should be worn constantly until the headaches are cured, when they need only be used for prolonged work.

For adults, the glasses, as a rule, must at all events be worn when the eyes are being used for work either at near, or far distance. If, however, the intermittent use does not cure the headaches, the glasses must be constantly worn.

In some cases, different glasses are necessary for distance and near work, and then the bifocal form should be employed.

No cases demand more attention as to small matters of detail.

When everything necessary has been done to correct the refraction error, the trouble may still be kept up by the glasses not fitting, or not being worn properly by the patient.

To ensure success, it is absolutely necessary that the glasses worn should accurately fit the wearer's head, and great care must be taken as to the centering of the lenses, and that the

frames should be fitted for the work required, either distant or near.

The glass should be of the best quality and free from flaws; convex glasses should be made in periscopic (concavo-convex) form up to + 3, but over this strength biconvex.

As to the form of frames, it should be laid down at once that cylindrical glasses must not be worn in the ordinary folding-up pince-nez, but either as spectacles or as novel nippers. The latter are not quite satisfactory as they often produce discomfort from pressure on the nose, and spectacles can be more accurately adjusted by the patient and the optician.

It must always be borne in mind that the "general condition" has a very important bearing on the "local irritation," and that the patient's general health and condition must be carefully investigated. It is this factor, and its proper diagnosis, that must make an oculist better able than an optician to prescribe glasses for the benefit of the patient.

There are many patients complaining on reading of headaches which are due to anæmia and deficient blood supply to the ciliary muscle; these may need only a course of iron tonic.

Accommodation.—Spasm of accommodation occurs chiefly in children; in order to overcome the cramp of the muscle atropine must be used for some days. If hypermetropia is found, glasses must be ordered and worn before the atropine effects pass off.

In presbyopia, glasses must be ordered for reading and close work.

In paresis of accommodation due to diphtheria, over lactation, anæmia, etc., iron tonics must be prescribed, and, if necessary, the weakest glasses possible given for near work.

Extrinsic Muscles.—The usual cause is insufficiency of convergence power, which should be treated when due to anæmia, by tonics. It is a good thing to exercise the convergence muscles by fixing an object, as the finger, in the middle line at a distance, and then approaching it as close as possible to the face; this exercise should be repeated quickly from one to five minutes at a time. In some cases, decentering

the spectacles inwards, thus producing a prismatic action, may be prescribed, or prisms may be ordered with their bases inwards.

Affections of the ocular media, tissues, or optic nerve must be treated according to the disease.

In marked insufficiency and in the rare cases of absence of convergence power, good results are often obtained by advancement of one or both internal recti muscles.

(*f*)—HEADACHE OF NASAL ORIGIN.

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IT will be generally admitted that, in investigating the cause of a headache, every local source for the trouble should be carefully sought for. Amongst the local causes of headache, affections of the nose occupy a prominent position. It is important to bear this in mind, for patients frequently seek relief for headache alone, and may complain of no symptoms distinctly implicating the nose. In these circumstances the nasal disorder, which is the cause of the trouble, may be easily overlooked. Whilst emphasising this it is perhaps even more important to avoid the opposite error; even if a headache is associated with nasal trouble, a thorough systematic general examination must never be omitted; otherwise the nose may be blamed, and, worse still, treated, when the patient is really suffering from some grave disease, such, for instance, as chronic nephritis.

Headache—including in this term all kinds of pain in the head—resulting from nasal affections may vary much in character, in site, and in degree. It may be constant, or periodic. It may be described as a dull aching sensation, or as sharp and stabbing, or as a feeling of heavy pressure; it may be localised to the frontal region, to the vertex, or to the back of the head; it may radiate all over the head, even true hemicrania may be met with. It is probably true to say that all forms and varieties of headache may be met

with, and that there is often no characteristic feature indicating its nasal origin. Further, pain of similar kind to that usually associated with nasal disease may be due to disease of other organs, or to general causes. Still, speaking generally, the pain in the head associated with nasal disease is apt to be more circumscribed, and more continuous than headache due to other causes. It often seems to start from, or to radiate into the nose, and is often neuralgic in character rather than true headache.

The following nasal conditions may give rise to more or less distinguishable forms of headache :—

(1) The headache resulting from nasal obstruction. This is especially common in children suffering from adenoids, but may also be met with in adults suffering from nasal polypi, hypertrophic rhinitis, etc. In children with adenoids, as is well known, there is deficient oxygenization of the blood at night because they persist in attempting to breathe through the nose during sleep in spite of the nasal obstruction. The impaired aëration may be so marked as to cause cyanosis, and commonly results in disturbed rest, night terrors, etc. The deficient oxygenization of the blood and the disturbed rest are probably the chief causes of the headache, but it may be partly due to circulatory disturbances and partly also to lymphatic obstruction. In adults, headache is more common in disease of the ethmoidal region than in disease of other parts. The pain in this condition is usually of a dull aching character, occurs chiefly in the morning on waking from sleep, and wears off during the day.

(2) Referred pain from nasal pressure. A typical example of this form of headache is that due to enlargement of the anterior end of the middle turbinate. It is probably a pressure pain, the enlarged turbinate being compressed between the septum and the outer wall of the nose. The pain is referred chiefly to the supra-orbital region of the same side, whence it may radiate down the nose, into the eyes, and across to the opposite side. When very severe, it is accompanied by superficial tenderness in the supra-orbital region and over the nasal bone. This pain is often considered a sign of frontal sinus suppuration. It may indeed be associated with suppuration, either in the frontal sinus, in the antrum, or in the

ethmoidal cells, but it may occur independently of any sinus trouble, and generally disappears as soon as the anterior end of the middle turbinate has been removed. The pain is frequently periodical, depending upon intermittent swelling of the mucous membrane covering the bones.

Large spurs on the septum in contact with the turbinates may also give rise to headache. Thus I have seen one case of severe hemicrania, absolutely limited to one side of the head, cured by the removal of a large spur on the septum. The patient had long sought relief in vain, but at length had her nose examined, as she had slight nasal obstruction on the affected side. The cure was confirmed four years later. Many similar cases are on record. Occasionally the headache may be due to hypertrophies of the inferior turbinate, or to other nasal tumours or swellings. Simply packing the nose with a strip of gauze may give rise to a headache in susceptible persons.

(3) Lastly, headaches, more or less definitely localised, may result from acute or chronic inflammatory affections of the various accessory cavities of the nose. The headache, in these circumstances, is generally periodic, and is associated with other symptoms of nasal disease. The patient often complains that the headache commences in the morning, and gradually increases for two or three hours, when most intense, discharge commences to flow away from the nose, and the pain slowly subsides. This group of symptoms is almost pathognomonic of sinus suppuration. When due to disease of the frontal sinus, the pain is usually most intense on the top of the head towards the posterior part of the frontal bone. The patients often complain of a feeling of a heavy weight in this region. There may also be pain over the frontal region radiating into the eyes. When intense, the pain is usually accompanied by superficial tenderness over the posterior part of the frontal bone, and over the innermost part of the roof of the orbit.

Pain due to disease of the sphenoidal sinus is usually referred to the back of the head, whence it radiates down the back of the neck, and is often accompanied by a feeling of stiff neck. Pain, due to ethmoidal disease, may be referred to the frontal region, to the eyes, or described as situated

deep in the head behind the eyes. The pain, due to antrum suppuration, is more often situated over the malar bone, but it may extend upwards into the temporal region. All these forms of headache may be accompanied by pain in the supra-orbital region as a result of the associated enlargement of the anterior end of the middle turbinate.

Thus, while it is impossible to make any exact statement as to what forms of headache are due to nasal trouble, or to exclude disease of the nose as the cause of the pain from its particular character or site, it is necessary to emphasise the fact that headaches may be due to disease of the nose, although obvious symptoms of nasal disease may be absent, and there may be nothing in the patient's statement to draw attention to the true cause. A headache should never be considered neurotic, or functional in origin, until every source of local trouble, amongst which nasal affections occupy a prominent place, has been excluded.

MYOMECTOMY.[1]

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THE operation, to which this name is given, consists, strictly speaking, of the removal of myomatous tumours, fibroids, as they have been, and are still usually called, from the body of the uterus :—interstitial fibroids ; not the pedunculated growths of the same nature attached to the peritoneal or the mucous surface of the uterus. The operation is a modern one ; for its successful performance has only been possible since the introduction of strict asepsis in every detail. Three cases, under my care in the hospital within the last few months, have been successfully dealt with by this method, and, in order to trace the gradual evolution of this operation, let us pass in review the different methods of treatment of fibroids from pre-antiseptic days down to the present time.

Myomata are of the same nature and substance as the walls of the uterus, and spring from muscular tissue. They are accordingly found arising in the different parts of the womb and its appendages, the walls from the cervix to the fundus, the Fallopian tubes, the ligaments of the ovaries, the utero-sacral ligaments, and, according to some authorities, from the ovaries themselves, though, in the last-mentioned cases, the tumours have most likely arisen from prolongation of some muscular fibres from the ovarian ligaments.

They usually occur after the age of 30 in unmarried women, in married women who have never borne children, and in those who have borne one or two children in early married life, but who have remained sterile for some years afterwards. The question of causation, however, cannot be dealt with now.

The oldest method of treatment of fibroids is—

1. The *expectant*, or waiting for the natural onset of the menopause. It was very largely adopted in the past in conjunction with the method next to be mentioned, and is still in favour with many practitioners, justifiably so, I consider

[1] A clinical lecture delivered at Guy's Hospital.

in some cases. It must be remembered that one cannot recommend an operation for fibroid on the ground that, if the tumour is left alone, it must inevitably prove fatal. All our experience is against such a view, in marked contrast to that which obtains in the case of an ovarian cyst. At the present moment I have under observation many ladies who are quite well, who have had fibroid tumours for periods of from 5 to 20 years, and who have attained the menopause with the consequent result that the tumours are getting smaller. Most men of long experience can tell you of similar cases, but neither I, nor any one else, can speak of cases of ovarian tumours which have existed for years without operation, for, as a rule, they cause death in about two years unless they are removed. Hence all are agreed that ovarian tumours should be removed as soon as they are diagnosed; but, in the case of fibroid tumours, it is a good practice to adopt the waiting treatment in certain cases, in which the tumour is causing no trouble, and the patient is within measurable distance of the change of life. Removal in every case is therefore not a necessity, but the decision in each instance must depend upon the merits of the case. The mortality of hysterectomy in these days of asepsis has fallen so low that it is justifiable to recommend operation in a much larger number of cases.

2. *Drugs.*—Numerous and different remedies have been given internally for fibroids, ergot and ergotine of course most of all, partly for the purpose of curing the affection and partly also for arresting the menorrhagia, which is so often the chief complaint. Iron, strychnia, digitalis, bromides, thyroid extract, adrenaline, and many others have been and are still given with more or less success. Best of all is a combination of ergot and hydrastis.

℞ Ext. Ergotæ Liq. - - - - } aa ʒss.
Ext. Hydrastis Liq. - - - } aa ʒss.
Aq. Chloroformi - - - - ad j M.
3 vel 4 in die sumend.

3. *Diet.*—In some quarters, stress has been laid upon the importance of a strict diet in fibroids, but, as a rule, there is no emaciation, and the patient can take ordinary food with advantage. It is, important, however, to remember that the long continued use of ergot will set up dyspepsia. When this

drug has been taken for some length of time, it should be left off for a few days every two or three weeks, in order to avoid upsetting the digestion.

4. *Hygiene.*—Tight corsets, belts, bands, and so forth, must be left off, in order to allow room for the tumour to grow upwards, and thus to prevent the severe and harmful pressure-symptoms, which are caused when the growing tumour is forced to remain in the pelvis. Constipation must be strictly avoided, partly on account of the ill-effects upon the general health from retained fæces, and partly on account of the injurious influence of straining at stool. It is well for the patient to rest in bed for the first day or two of the period, as the loss is at times very large and exhausting. The good effects brought about by treatment at different spas and health resorts must be set down chiefly to the credit of the rest and regular life rather than to the curative powers of the baths and waters.

5. *Intra-Uterine Applications.*—It was for a long time considered that the excessive hæmorrhage at the period was due to endometritis. Various caustics have been applied to the suspected mucous membrane in accordance with this idea. Without denying that some endometritis may be present, and share to some degree in the causation of the menorrhagia, it is, nevertheless, obvious that the main cause must be attributed to the increase in the area from which bleeding comes, brought about by the enlargement of the cavity of the uterus, which is due to the growth of the tumour.

Iodine, carbolic acid, iodised phenol, strong nitric acid, and the actual cautery, are some among the many applications which have been used. They have the great disadvantage of sometimes causing sloughing of the tumour, which may lead to death from septicæmia.

6. *Curettage* was a later development of the foregoing, the caustic application being made after curetting had been thoroughly carried out.

7. *Electricity.*—This mode of treatment had a great vogue for a time, after its introduction by Apostoli about 1887. I mention it now merely to condemn it as useless. It was largely tried at first throughout the country, but it was found that it resulted in causing the patient very great pain, and

sometimes led to sloughing of the tumour with its attendant fatality. The treatment has been abandoned, and is no longer employed by any reputable practitioner.

8. *Oöphorectomy*, or the removal of healthy ovaries in order to induce the menopause and its effects artificially. This operation was frequently performed some years ago, but it has gradually fallen into disuse. Very few nowadays will recommend it. It was found that complete removal of all ovarian tissue was not, and perhaps could not be, invariably carried out, consequently the purpose of the operation was defeated. A very small amount of ovarian tissue is sufficient to keep in being the function of menstruation. The usual result of the growth in bulk of the uterus is that the ovarian ligaments become stretched out over the womb, so that the ovaries themselves become sessile and closely applied to the uterus. Although these were removed, yet sufficient ovarian tissue remained behind in the ligaments to keep up the necessary stimulus for menstruation.

9. *Ligation of Arteries.*—This operation was proposed as a variant of the above. The uterine and ovarian arteries were all ligatured, but the result was rarely satisfactory, and it is now seldom or never performed.

10. *Removal of Polypi.*—It has for long been the universal practice to remove these, when it was possible to reach the pedicle, but it was feared that troublesome hæmorrhage would result if this was cut cleanly through. This idea led to the introduction of the wire-écraseur, an instrument never seen to-day in an operating theatre. The wire loops crushed through the pedicle and thus favoured natural hæmostasis in the torn ends of the vessels. It has since been found that, if the stalk of a polypus is cut through with knife or scissors, little or no hæmorrhage results, as the muscular tissue composing it shrinks at once and compresses the vessels. Moreover, if the polypus is very large, pieces can be cut out with knife or scissors until the pedicle can be reached without much bleeding.

11. *Morcellement*, or enucleation of the tumour per vaginam. This may be looked upon as a myomectomy. The fibroid is taken away piecemeal. It is necessarily a somewhat hazardous operation, especially when complete asepsis cannot be assured,

as, for example, when the tumour is semi-gangrenous. At one time, however, it was a less hazardous operation than procedures which involved opening the peritoneal cavity.

12. *Vaginal Hysterectomy.*—It will be noticed how very carefully operators sought to avoid performing anything which might open and endanger the peritoneal cavity, and it is interesting to note that it was less dangerous at first to open it per vaginam than through the abdominal wall. Hence vaginal hysterectomy began to be practised, but was found to be inapplicable to the majority of cases, as the tumours were too large.

13. *Supra-vaginal Hysterectomy.*—This was the first step in abdominal operation, and the same desire to exclude the peritoneum from possible infection led to the stump, left after removal of the uterus, being brought out of and secured to the abdominal wound. It was grasped tightly and kept in position by a wire loop, called the *serre-nœud*, so as to avoid dropping the pedicle back into the abdomen. This was an extremely painful ordeal for the patient, as the wire loop had to be screwed tighter day by day upon the shrinking pedicle, until the distal portion had sloughed off. In order to relieve the pain and suffering so caused, it was necessary to keep the patient under the influence of morphia. The sloughing process not infrequently caused weakening of the scar in the abdomen owing to suppuration. Baer was one of the first to modify the operation by giving up the wire loop and ventrifixation. He tied the ovarian and uterine vessels, cut through the broad ligaments on each side, amputated the uterus by cutting through the cervix, and then stitched the peritoneum over the stump. Baer's operation is the one usually performed at the present time.

14. *Pan-hysterectomy.*—This term implies the removal of the whole of the uterus, but leaving the ovaries, and thus avoiding the induction of the menopause with its attendant discomforts, since the absence of the uterus does not affect the ovarian function. The operation came into favour, as it afforded no opportunity for after-suppuration, which had been found to occur somewhat frequently in the stump after supra-vaginal removal, as well as in Baer's modification. Both operations are more successful now, owing to the fact that

good and thoroughly asepticised ligatures are obtainable. Other things being equal, I always prefer to leave the cervix, and, if possible, a portion of the body of the uterus, in which case the patient not only ovulates, but also has a slight menstrual flow.

15. *Myomectomy.*—This is, I consider, the ideal operation whenever it is possible of performance. I do not include in this the removal of polypi, or of pedunculated subperitoneal fibroids, but reserve the term for removal of interstitial fibroids from the wall of the uterus through an abdominal incision. The operation is not really a new one, for Martin of Berlin performed it twenty years ago. He opened the abdomen, cut into the cavity of the uterus, shelled out the fibroid, and then sewed up the uterus. At that time complete asepsis was not, or had not been, secured, and a fatal result followed.

As performed now, the cavity of the uterus need not be opened. The body of the uterus is incised until the capsule of the fibroid is reached. The tumour is then enucleated and removed. If multiple tumours are present, each one is similarly served. The hæmorrhage which follows is best arrested by running a fully-curved needle, carrying chromicised gut, round the bottom of the cavity and tying. The wound in the uterus is then sewn up with catgut sutures. The operation is not possible in every case of fibroid, for some are of so large a size that nothing but a thin shell of uterine tissue remains ; for such hysterectomy must be performed.

The question of ligatures is a most important one, and has a great deal to do with the success of this operation and of all others of this sort. It is imperative that the ligatures should be completely aseptic and absorbable. Catgut, and not silk, therefore, must be the material. I believe that all bad results can be traced to the use of silk ligatures, which being permanent offer a chance for absorbing infection from the rectum. Catgut ligatures disappear by absorption in thirty days at the outside.

It has been objected that the cavities left in the wall of the uterus after removal of the tumours are a disadvantage ; at all events they are not dangerous so long as the technique is perfect.

In one of my recent cases I opened the uterine cavity, as

the fibroid had got extremely close to the endometrium. There had been no discharge from the uterus before operation, so that the cavity could be looked upon as sterile. The wound was sewn up on the peritoneal surface only, and no ill-effect followed.

The advantages of the operation are that it leaves the patient unmutilated, with her reproductive organs intact, child-bearing is possible, the change of life occurs naturally and in due course, and, in the meantime, the patient's life is brighter and happier, being free from the inconveniences and drawbacks of a too early menopause. So far as can be judged, the effects of the operation do not seem to render the course of any subsequent pregnancy and labour specially dangerous. I believe the operation will on its merits be performed more and more frequently in the future, and every modern practitioner should therefore know of it and its usefulness.

Time does not permit me to give the details of the cases operated on during the past few months. Mention has already been made of one case, in which the cavity of the uterus was unavoidably opened. In a private case, now in Bright ward, I removed no less than six fibroid tumours, varying in size from a marble to a tangerine orange, by myomectomy. Every case has made an excellent recovery, which is due to the fact that the technique was aseptic, and the tissues themselves were aseptic. It is impossible to lay down rules, and an operator must use his common sense in deciding what is best to be done. Speaking generally, I should say that myomectomy should not be attempted in large interstitial fibroids when their enucleation would leave a thin and large shell of uterine tissue, nor in any case in which there is necrobiosis, or any septic conditions. Supra-vaginal, or panhysterectomy should be performed in such cases.

FRONTO-ETHMOIDAL SINUSITIS:

THREE CASES IN WHICH SPONTANEOUS EVACUATION TOOK PLACE IN THE REGION OF THE ORBIT.[1]

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[With Plates IV.—V.]

Cases in which chronic suppuration in the frontal and ethmoidal cavities discharges into the nose are of common occurrence in the practice of the rhinologist. But those cases, in which the pus fails to escape by the natural *ostia*, and makes a way for itself through the bones to the face, are rarely met with. Possibly, this is because some of them are treated by the general surgeon, and others first consult an ophthalmologist. Three cases have lately come under my notice in which the pus traversed the bone, and appeared as an abscess on the face. The after-history was different in each instance, and the record is interesting, as it helps to complete our knowledge of suppuration in these accessory nasal cavities. The cases also seem to me to warrant an analogy with what we already know of the possible evolution of pus in the mastoid cavity.

In the first case, a simple incision into the abscess on the face was followed by complete cure—a result which we can compare with the success which may follow a Wilde's incision into a sub-periosteal mastoid abscess. In the second case, the abscess on the face was incised, but the frontal sinus was also opened and drained. The conditions, treatment, and the resulting cure, are analogous to a retro-auricular abscess of mastoid origin, in which the mastoid antrum is opened and drained, but without interfering with the tympanic cavity. Finally, the last case, in its history of chronic nature with exacerbation, and in its progress, can be compared with the cases of chronic otorrhœa of antro-attic origin requiring a complete post-aural operation.

[1] Read before the International Congress of Medicine in Lisbon.

CASE I. INFLUENZA.—*Abscess at inner canthus of left eye; incision and evacuation of pus; symptoms of suppuration in left frontal, ethmoidal and maxillary sinuses. Complete cure without further operation.*

A female, aged 18, suffering from an abscess pointing at the inner canthus of the left eye, near the root of the nose, consulted Mr. H. Willoughby Lyle at the Royal Eye Hospital on June 2, 1905. A month previously she had had influenza and pain round the left eye. The eye "swelled up and closed in a single night." Under chloroform the abscess was opened and a large quantity of pus evacuated. It appeared to come from a deep situation in the inner wall of the orbit. A probe was passed into the abscess cavity, and bare bone was felt. (For these notes I am indebted to Mr. Willoughby Lyle, who kindly sent the patient on to my clinic in King's College Hospital.)

20 June.—There is no swelling or œdema of the left eyelids, but a congested wine-like staining of all the upper eyelid, and around the inner canthus, where there is a fistulous opening secreting pus (Fig. 1). A probe enters this for one inch, in the direction of the ethmoid, and bare bone is felt.

The patient states that she had a bad taste in her mouth when the influenza started, but that it is not perceptible at present. She still uses more than two handkerchiefs a day. Transillumination shows complete obscurity of the left maxillary and frontal sinuses, there being no sensation of light in the left eye, and no semilunar arc of light below the left orbit. The sinuses on the right side are quite translucent. No pure pus is seen in either nasal chamber, but muco-pus shows in the left middle meatus and the post-nasal space. On this being cleared away, and the head bent forwards, pure pus appeared in the left nostril, and poured out freely from the fistula.

The patient was instructed to use a steam inhalation of menthol, and to apply boracic fomentations, and a tonic was prescribed.

11 July.—(Five weeks after the abscess had been opened.) The fistula had ceased discharging for three days. She still complains of pain, and the upper eyelid and inner canthus region are discoloured. The left maxillary sinus was punc-

Fig. 1. *Case I.—Suppuration in the left frontal, ethmoidal, and maxillary cavities. Congestion of left upper eyelid; fistula at inner canthus, discharging pus, and leading down to the fronto-ethmoidal region.*

Fig. 2. *Case II.—Abscess over root of nose, originating in the right frontal sinus, and due to the Micrococcus catarrhalis.*

Fig. 3. *Case II. seen in profile.*

Fig 4. *Case III.—Pan-sinusitis. The right upper eyelid is stained and paretic A fistula in the centre discharges pus and leads down to a fronto-ethmoidal cell.*

tured from the nose, and pus washed out. No recurrence took place till the middle turbinal was pushed inwards, when there was a free outpouring of pus into the nose. This confirmed the presence of pus in the frontal sinus, as well as in the ethmoidal and maxillary cavities.

18 July.—No pain. No pus from fistula and none in the nose.

25 July.—The fistula has closed.

17 October.—The patient is quite well. There is no staining round the eye. A small scar is visible where the orifice of the fistula was. No pus in the nose, and the patient says she never requires a pocket handkerchief. Transillumination shows all the accessory cavities on both sides to be freely and equally translucent, and the light is felt in both eyes.

These observations were confirmed by Dr. von Eicken, of Freiburg.

CASE II. FRONTAL SINUSITIS.—*Abscess over sinus; incision; free escape of pus containing the Micrococcus catarrhalis in pure culture. Periosteum undermined. Sinus opened and drained through anterior wall. No pus seen in the nose at any time. Complete cure.*

A lad, aged 11, was seen on October 21, 1905, in the "Home for Little Boys" by Mr. W. F. Lace, of Sutton-at-Hone, to whom I am indebted for his careful notes of the early stage of the illness. The lad had a slight "cold," was out of sorts, and complained of a sore throat, but nothing particular could be seen about the fauces. Several boys in the Home were ill with "colds" and slight tonsilitis. When next seen, on October 24, there was tense œdema (without redness) of the right eyelids, with slight œdema and tenderness over the mid-frontal region, more marked to the right of the median line. Decided tenderness at the upper and inner angle of the right orbit. No history of pus in the nose, and none could be seen. No record of a blow, or sign of a bite or sting. Temperature, 101° F.

25 October.—Admitted to King's College Hospital. Temperature, 99·6°. Pulse, 98. Patient complains of no pain or sickness, and eats and sleeps well. The right eye is practically closed by œdema; the left is partially occluded. Over the

right frontal sinus is a diffuse, soft, slightly red, and very tender swelling. There was no discharge from the nose, and no pus could be discovered. The ears were normal. Mr. L. V. Cargill reported that there were no ocular changes.

The patient was kept in bed; calomel was given; hot fomentations were applied; and the steam inhalation of menthol was ordered.

27 October.—Temperature normal. Swelling subsiding, so that the left eye is quite open, and the right can be partially uncovered.

31 October.—Eyelids on both sides practically normal, but a slight fulness, not red, remains over the root of the nose, chiefly on the right side.

Repeated examinations failed to detect any pus in the nose. The temperature continued normal.

7 November.—(Fourteen days after first appearance of swelling.) Temperature, 101·2°. Return of increased fulness of forehead and puffiness of eyelids. The upper and lower eyelids on both sides are puffy, the right eye being nearly quite closed. The inner extremity of the right upper eyelid is stained reddish. Over the glabella, chiefly on right side, is a fluctuating, white, even swelling. No pus in the nose, even on stooping the head.

9 November.—Temperature had returned to normal; good night; no headache. The puffiness of the eyelids had somewhat subsided, but the roundish, fluctuating, uninflamed swelling is more marked over the root of the nose, chiefly on the right side. (*Vide* photos., Figs. 3 and 4.)

Chloroform.—On incising the swelling there was an escape of free fluid pus. The periosteum was undermined, and the bone was bare and congested. The frontal sinus was therefore opened, and found to be the size of a hazel nut (without its shell). The mucous membrane lining it was normal, but on enlarging the ostium, the mucosa of the anterior ethmoidal cells was swollen and polypoid-looking.

No attempt was made to keep the passage to the nose patent; the mucosa was not curetted. No stitches were introduced; but the wound was stuffed with iodoform gauze, and allowed to heal up from the bottom.

Dr. Emery reported that the pus contained the *Micrococcus catarrhalis* in pure culture.

There was no reaction, and the patient was up and about four days later. The wound closed without further suppuration.

1906, 16 January.—Patient came up from country to show himself. No swelling or pain. No pus in nose.

March.—Patient continues quite well.

CASE III. CHRONIC MULTI-SINUSITIS. — *Acute fronto-ethmoidal exacerbation. External abscess; incision; fistula. After two months, operation showed that this led down to a fronto-ethmoidal cell, and that extensive operation was required.*

A woman, aged 35, had been accustomed to use two to three handkerchiefs daily in winter, and to hawk up thick muco-pus. She had never had cacosmia.

In November 1904, she had violent pain over right eye, the eye swelled up off and on through the winter, and the bone was tender. Seven weeks before admission to King's College Hospital, the right eye was swollen up, a doctor lanced it, yellow matter came out and had been escaping ever since. She had seen double during the last three weeks.

1905, May 23.—The right upper eyelid is stained red, and is paretic. In the centre of it is a fistula, discharging pus, and a probe enters it to a depth of 1½ inches till bare bone is encountered in the region of the frontal roof of the orbit. (Fig. 4.)

There is paresis of the right superior oblique muscle, and slight diplopia on looking outwards and downwards to the right.

Transillumination does not show either maxillary sinus to be quite translucent, the right being the more opaque. The right frontal sinus appears slightly more opaque than the left.

In view of these findings, it was hoped that the fistula communicated with a closed empyema of the right frontal sinus, and that, if this were simply opened, the result would be as promptly satisfactory as in the two previous cases. This expectation was not realised, and the case proved to be one of the most complicated, anxious, and tedious with which I have ever had to do. The right frontal sinus was

opened, and found to be bulging with polypoid thickening, bathed in pus. But the cavity had no communication with the fistula opening in the upper eyelid. This was traced to a front-ethmoidal gallery in the roof of the orbit, and, in order to lay it bare, it was necessary to detach all the soft tissues, together with the attachment of the superior oblique, to the upper inner margins of the orbit. The resulting diplopia was at first marked, but steadily diminished, and in time practically disappeared. A Killian operation was completed on the right side.

Progress was satisfactory for seven weeks, and then, without rise of temperature, the patient complained of frontal pain, and a soft swelling appeared over the centre and the *left* side of the forehead, with some œdema of the inner extremity of the left upper eyelid. It was thought best to re-open the right fronto-ethmoidal wound, but as no cause was there discoverable, I opened the left frontal sinus, and found it contained dirty greenish-yellow pus under pressure. A Killian operation was therefore performed on the left side. Subsequently, both maxillary sinuses were opened, as pus was later on discovered to be coming from both these cavities. Various complications ensued, which it is unnecessary for the present paper to describe; the instructive point being that what at first appeared to be a simple case was found to be associated with chronic suppuration in all the accessory sinuses on both sides of the nose, although no pus was discovered in the nasal chambers at several examinations before operation. The patient, after many months of treatment, made a good recovery.

As already remarked, these cases of fronto-ethmoidal suppuration pointing externally are analogous to what we meet with in retro-auricular mastoid abscess. They show that, if the infection is a recent one, early incision is sufficient to effect a cure (Case 1), or incision and drainage of the bony cavity (Case 2). But if the sinus suppuration is of long standing, and the external abscess only an exacerbation due to retention, or to some fresh infection, a radical operation is called for (Case 3).

The value of transillumination is seen in Case 1, in which only the cavities on one side of the nose were affected, and the

contrast of the two sides was decided. This case also shows the return of perfect translucency which takes place on recovery from a recent, acute sinusitis. If the cavities on both sides are affected (Case 3), transillumination is of less assistance.

The absence of fever, or general reaction, is noteworthy, as it might lead to postponing suitable interference, and so favour the establishment of a chronic empyema, or extension to other cavities.

The discovery of the Micrococcus catarrhalis in Case 2 was interesting, especially as the case occurred in a patient exposed to infection from several others, who were ill with "colds" and tonsilitis. The frontal sinus is seldom evident before the seventh or eighth year, and only develops decidedly at puberty, so that the youth of this patient is noteworthy.

I have never before met with frontal sinusitis in a patient so young as 11 years.

ON OPSONIC FACTORS; THEIR ESTIMATION AND USE IN THERAPEUTICS, WITH SOME ILLUSTRATIVE CASES.

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The important study of opsonic factors does not necessarily lead to the conclusion that medicine is to be revolutionised; but merely that one more weapon—a very serviceable one, no doubt, when properly used—is added to our armament with which to carry on an unceasing warfare against bacterial diseases. Treatment by inoculation, controlled by the estimation of opsonic indices, opens up new fields for investigation, offers fresh explanations of accepted facts, and, above all, enables many cases of localised bacterial infection, which have obstinately resisted all other methods of treatment, to be successfully dealt with.

To Dr. A. E. Wright, of St. Mary's Hospital, we are indebted for the evolution of a working hypothesis which assumes the presence, in the serum of man and animals, of a substance (to which he has given the name of "opsonin," derived from the Greek word $\dot{o}\pi\sigma\omega\nu\epsilon\omega$, "I cater for"), which has the power of acting on the invading bacterium in such a way as to render it an easy prey to the phagocytes. He assumes, moreover, the existence of a separate and distinct opsonin for almost everyone of the many pathogenic species of bacteria, and consequently also assumes that the degree of resistance of an organism to invading bacteria depends largely on the quantity of opsonins present in the blood. The importance of being able to readily estimate the various opsonins quantitatively, and with a certain amount of accuracy, becomes at once obvious; but in this, unfortunately, many difficulties are encountered.

METHODS USED FOR ESTIMATING OPSONINS IN THE BLOOD.

The quantitative estimation of opsonins is of comparatively recent date. In his earlier series of cases, Wright gauged the

effects of his therapeutic inoculations by means of the agglutinating reaction.[1] This reaction, however, is unsatisfactory for several reasons; it is difficult or impossible to emulsify some bacteria; sometimes clumping does not take place even when such reaction should, *à priori*, be confidently anticipated, or, if present, clumping is not infrequently brought about by some other factor than the serum to be tested; and most important of all is the perfectly valid contention that agglutinins, although they are elaborated in response to similar stimuli, and, although they are equally important factors in the consideration of problems dealing with immunity and susceptibility, are not identical with opsonins, and that the curves of these two substances plotted from the same serum exhibit no constant or regular relationship.

Another method,[1] for a time employed by Wright, was as follows:—An emulsion of the responsible bacterium was prepared, and a certain volume of this was mixed with an equal volume of the patient's serum; another volume was mixed with an equal volume of normal serum, and a third with physiological salt solution. These three samples were added to a suitable culture medium and incubated at the optimum temperature for the growth of the bacterium in question; the relative powers of inhibiting bacterial growth, possessed respectively by the normal serum and the patient's serum, could then be determined by ascertaining the number of colonies which developed in each preparation, the one which yielded the fewer colonies being considered to possess the higher opsonic index. This method is open to objection, inasmuch as it has not been shown that bacteria acted on by opsonins, any more than those acted upon by agglutinins, are incapable of growth when placed under favourable conditions. Then, too, estimations done in this way are cumbersome, and at best give only a very rough idea of the relative powers of the two sera. At the present moment, practically all other methods have been superseded by one originally introduced by Leishman for the purpose of estimating the phagocytic power of blood, and, as modified by Wright, of forming a very delicate indication of the opsonic content of the blood serum. In carrying out the details of this process, minor

differences mark the technique of different workers. The method carried out in this laboratory is as follows :—

Three preliminary operations are necessary, namely :—

(*a*) The collection of 10 to 20 c.mm. of serum from the patient and a like quantity from a normal person, carried out as follows :—

Cleanse the lobe of the ear, and at the same time render it hyperæmic by vigorous rubbing with a piece of lint saturated with ether. Allow the ether to evaporate, make a small puncture with a surgical needle, and then, by gently squeezing the lobe of the ear, cause a few drops of blood to exude. Collect the blood in a small glass pipette with capillary ends ; seal the ends, and, when the blood has clotted firmly, centrifugalise, so forcing the clot into the narrow part of the tube and leaving clear serum above.

(*b*) The preparation of a sufficient volume of human "washed" blood corpuscles, thus :—

Collect blood (approximately, 0·1 cc. for each serum to be tested) from the ear of a normal individual, or of a patient anæsthetised for operation (after cleaning, etc., as detailed under (*a*)) in a sterile capillary pipette, previously moistened with sterile 1·5 per cent. sodium citrate solution, and transfer at once to a tube containing some 8 to 10 cc. of the citrate solution. Sodium citrate, it may be mentioned, by removing the calcium salts from the freshly-shed blood, completely prevents clotting. Centrifugalise thoroughly to throw down the corpuscles, and pipette off the supernatent fluid ; then add 10 cc. of sterile saline solution (0·75 per cent.) to the corpuscles, shake well, and centrifugalise again.

This washing with normal saline solution is repeated with two further changes of the solution, and the cells are then ready for use.

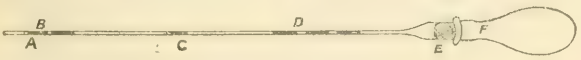
(*c*) The preparation of a suitable emulsion of that bacterium against which the sera are to be tested.

The preparation of a bacterial emulsion varies somewhat with the organism to be emulsified. In the case of a coccus—staphylococcus, streptococcus, pneumococcus, gonococcus, etc., pour a little sterile 0·1 per cent. saline over the surface of a 6 or 12 hour growth in tube culture on sloped agar, and

shake gently. This produces a turbid fluid containing free cocci and clumps of various sizes; transfer this to a small glass tube, and centrifugalise for three or four minutes in order to throw down the clumps. To the experienced eye, the opacity of the emulsion is sufficient to show whether centrifugalisation has been sufficiently prolonged, so that it is unnecessary to make a film preparation and examine it microscopically. To prepare a tubercle emulsion, grind up a small nodule of the growth from a glycerinated potato in an agate mortar (which should be moistened previously with a drop of sterile 0·1 per cent. saline) to form a thick milky fluid, then dilute with 0·1 per cent. saline, mix thoroughly and centrifugalise as for emulsion of cocci. If a large quantity of tubercle emulsion is made in this manner and sterilised by heating to 70° C. for an hour, it can be kept perfectly well, sealed off either in small glass capsules, or in capillary tubes such as are used for vaccine lymph. It is important to use 0·1 per cent. saline, and not "physiological" (0·75 per cent.) salt solution for making emulsions, as the latter frequently causes clumping to take place.[2]

Transfer these four preparations, viz., patient's serum, normal serum, washed blood cells and bacterial emulsion, each to a separate watch glass or small test tube, and label.

After making these preparations, the apparatus further necessary for the estimation of the opsonic index consists of a number of capillary pipettes with a rubber "teat" or bulb attached to each, an incubator running at 37° C., a number of clean microscopical (3 × 1 inch) slides and some watch glasses. The pipettes should be dry-sterilised and plugged at the large end with cotton wool; the capillary part should be 12 or 15 centimetres long and sealed at the extremity.



A. Pencil mark.
B. Two volumes of serum.
C. One volume of emulsion.
D. Three volumes of blood cells.
E. Cotton-wool plug.
F. Bulb.

Make a mark with either file or glass-cutter's knife near the sealed extremity of the pipette, break off the end "square," and make a mark, with blue grease pencil, about 1 or 1·5 centimetre from the cut end. Now, holding the pipette by the rubber bulb, compress the latter between thumb and forefinger, dip the open capillary end into the receptacle containing the washed cells, and, by gently relaxing the pressure on the bulb, aspirate sufficient of the cells to fill the capillary tube up to the pencil mark, admit a short column of air to serve as an index, draw up a second similar volume of blood cells, another air index, and then a third volume of blood cells. In a similar manner, add one volume of bacterial emulsion and two volumes of the patient's serum to the contents of the capillary pipette. The order in which these fluids are taken up is important, as the washed cells must not be contaminated with either emulsion or serum, and the emulsion must not be contaminated with serum, for, if it were, opsonins might possibly be added to it, and these would then be passed on to the bacteria; a few blood cells present in the emulsion are of no consequence.

When all six volumes have been aspirated into the pipette, compress the rubber teat, and squeeze them out as one drop on to a slide, or into a watch glass, and mix thoroughly; the mixing being done by sucking the drop up into the pipette and squeezing it out again eight or ten times; finally, the drop should be sucked up into the pipette, the extremity sealed off in the flame, and the pipette labelled with a distinctive name or number.

Now prepare a similar pipette with three volumes of washed cells and one volume of bacterial emulsion, but substituting two volumes of normal serum for two volumes of patient's serum. Incubate both pipettes together for 15 minutes at 37° C., after which take each in turn, cut off the end, mix the contents once more, prepare a blood film, and mark carefully. It is advisable to make two slides from each pipette, as one may be spoiled or broken. The blood films are easily prepared by the slide method[3]:—half the drop of blood is placed on a clean slide near to one end, and the end of another slide held at an acute angle on the surface of the former, so that the blood runs in the angle between them. By

drawing the upper slide in short jerks along the surface of the lower, a thin film is spread out; it is an advantage to have a free edge to the film as the polymorphonuclear cells collect along this edge.

Fix the films in equal parts of alcohol and ether and stain secundum artem; those containing tubercle bacilli must be stained by the Ziehl Neelsen method and counterstained with toluidin blue; for cocci, staining for half a minute with toluidin blue gives perfect results. Next with a $\frac{1}{12}$-inch oil immersion lens and using a mechanical stage, count and note the number of bacteria in each of the first 50 polymorphonuclear cells that come into the field. The normal serum is taken as having an opsonic index of unity, so that the number found in 50 cells in the patient's slide, divided by the number in 50 cells on the normal slide, gives the opsonic index of the patient.

When several sera are to be tested against one organism, the same control (*i.e.*, the same normal serum) will serve for all.

CRITICISMS AND COMMENTS ON THE METHOD OF ESTIMATION.

As has been pointed out recently by Watson Cheyne,[4] the present method of estimating the opsonic index cannot lay claim to absolute accuracy. On the other hand, not only is it a great improvement on the two methods previously referred to, but it yields results which are directly comparable. Of the fallacies to which the method is open, many are obvious, and with ordinary care can be avoided. For convenience they may be considered under the headings of (A) preparation of the mixture, (B) preparation of the blood film, and (C) examination of the blood film.

(A) The serum should be freshly collected, or at most should not be more than 72 hours old. Again the serum may be injuriously heated in sealing off the pipette in which it is collected; this must be avoided, for Wright and Douglas[5] have shown that opsonins are thermolabile, and if serum is heated to 60° C. for a few minutes, its opsonins are destroyed; observations which have been confirmed by Bulloch and Atkin,[6] and also by Dean.[7] Then, too, a certain amount of dexterity, acquired only by practice, is essential to ensure accuracy in the

measurement of the three volumes of cells, one of emulsion and two of serum, aspirated into the pipette.

Slight differences in the time of incubation also render the results inaccurate. To avoid this error, the specimens should be put up in pipettes and sealed off, and then both specimens—the patient's and the control - transferred to the incubator at the same time, and 15 minutes later taken out together and blood films prepared immediately.

(B) In thick films, the phagocytes appear very small, while in thin films they are flattened out. In the former case the bacteria in the cells are hard to count, and in the latter easy; all films should therefore be thin. If one film is stained deeply and another lightly, the count will be higher in the former; lightly stained tubercle bacilli, for example, can very easily be passed over unnoticed; staining should, therefore, be as uniform as possible; counterstaining should not be too dark, otherwise it will be impossible to count bacteria overlying nuclei.

(C) Counting only a few phagocytes, or a very limited portion of a slide, may give rise to error. In all estimations to which reference is made by the writer, the result has depended on more than one count. In nearly every case, three observers have counted 50 or 100 cells each, and the average of the three indices taken; in this way as many as 300 phagocytes have been counted for one estimation, never less than 150. It is not surprising to find that three different, although equally experienced, observers, when counting the bacteria contained in 50 consecutive polymorphonuclear leucocytes present in any

Observer.	Patient's slide.	Control slide.	Index.	Average.
(1) R. E. F. - - -	197	202	·975	·942
A. - - -	202	218	·925	
B. - - - -	140	151	·927	
(2) R. E. F. - -	125	155	·806	·894
A. - - - -	172	214	·804	
B. - - -	105	98	1·071	

(Each observer counted 50 cells.)

given film preparation of blood, obtain very different results, for every individual undoubtedly has his own personal error; but as this same error holds good in counting both the patient's slide and the control slide, it is negligible, and consequently the three indices, as a rule, work out fairly accurate, as is shown by the above examples taken at random from my note-book.

In some cases, however, the results are very far apart, probably due to incomplete mixture of the contents of the pipette; but even in such cases, by taking the average of three indices, a result is always obtained very near what one would expect the index to be; the following is an example:—

Observer.	Patient's slide.	Control slide.	Index.	Average.
R. E. F. - - -	127	63	2·09	1·483
A. - - -	62	72	·862	
B. - - - -	101	64	1·578	

(Each observer counted 50 cells.)

This was from a case of tuberculous knee; four days previously, the index was 1·562, and the opsonin curve was then at the summit of a positive phase. These examples show that the preliminary manipulations must be very thoroughly and carefully carried out; at the same time if sufficient care has not been taken, by counting a large number of phagocytes in different parts of both slides, a fairly accurate result can be obtained.

THE NATURE OF OPSONINS.

Although many observers have been, and are, engaged in the study of opsonins, our present-day knowledge of the nature of these bodies is far from complete, and indeed the main points hitherto established may be epitomised very briefly as follows:—

The variable factor is present in the serum and, so far as concerns its quantitative estimation, is independent of the leucocytes.[6]

Opsonins are distinct from those substances which bring about bactericidal and bacteriolytic reactions.

The opsonin passes from the serum to the bacteria and acts upon them in such a way as to prepare them for ingestion by the phagocytes.[5 6]

Variations in the number of leucocytes in the blood do not correspond with similar variations in the opsonic index.[8 9]

In a large number of infections, *specific* opsonins can be detected in the serum.

Opsonins are destroyed by being heated to 60° C. for a few minutes, as shown by Wright, Bulloch and Dean. (Neufeld and Rimpeau, however, contend that opsonins are thermostable.)

The opsonic power of serum in vitro falls gradually, and, even when kept at 8° C. in the dark, falls to half its original value in about 10 days.

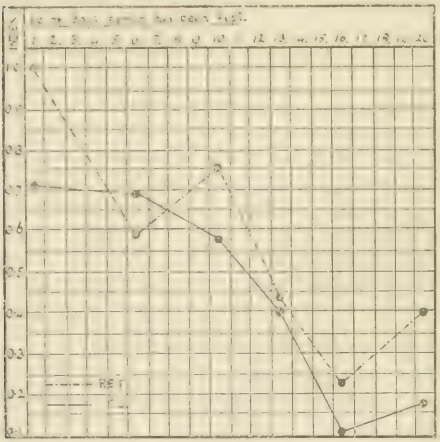


Fig. 2. *Curve showing the fall in the opsonic index to Staphylococcus albus of two samples of serum when kept at 8° C. in the dark. F. C. is a case of empyema of the frontal sinus caused by staphylococcus albus infection, and R. E. F. is normal.*

The *specificity* of opsonins has been demonstrated experimentally by Bulloch. He removed all the "tubercle" opsonin

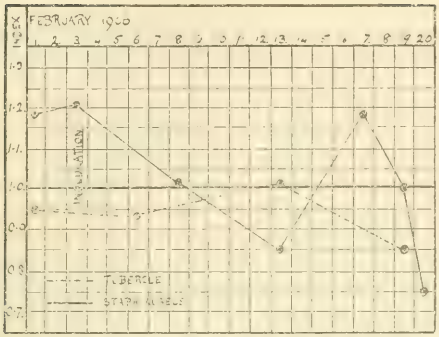


Fig. 3. *From a case of osteitis of the femur due to infection with staphylococcus aureus; this curve shows a typical reaction to an injection of staphylococcus aureus vaccine while the tuberculo-opsonic index remains normal.*

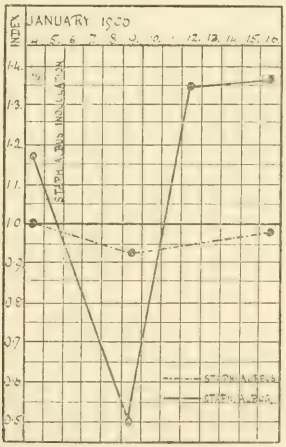


Fig. 4. *From a case of staphylococcus albus infection of the frontal sinus; this curve shows a typical reaction to an inoculation with staphylococcus albus vaccine while the opsonic index to staphylococcus aureus remains normal.*

from a sample of serum, by placing it in contact with an excess of tubercle emulsion, and subsequently freeing it from bacilli by prolonged centrifugalisation; the supernatant fluid now gave no opsonic reaction with tubercle bacilli, but did with staphylococci. He then reversed the experiment by first removing the "staphylococcus" opsonin, and showing that tubercle opsonin remained. He further showed that an inoculation of tuberculin caused a typical disturbance in the opsonic curve for tubercle, whilst the opsonic curve for the staphylococcus remained unaltered. The last observation is well illustrated by the curve from one of my cases; and I have further observed that patients, suffering from infection with staphylococcus albus, give a normal index for staphylococcus aureus which remains constant when an injection of staphylococcus albus vaccine is given and *vice versâ*.

This is interesting in that it shows that specific opsonins exist for each of these two species of staphylococcus; it also suggests the possibility of diagnosing the particular coccus responsible for an infection without culture experiments, and, perhaps more important still, suggests a method of differentiating various strains of staphylococci.

Specific opsonins have been demonstrated for each of the following organisms[11]:—

Bacillus pestis.	Micrococcus melitensis.
Bacillus anthracis.	Bacillus coli communis.
Bacillus dysentericus.	Bacillus typhosus.
Vibrio choleræ.	Pneumococcus.[12] [13]
Gonococcus.[14]	Bacillus pyocyaneus.
Streptococci.	Staphylococci.

VARIATIONS IN THE OPSONIC INDEX.

Although the principal observations upon opsonins have been carried out with reference to the tubercle bacillus, the following paragraphs apply equally to staphylococci and other organisms, for which specific opsonins have been demonstrated.

Bulloch[8] found that the opsonic index to staphylococcus was 1 in 25 healthy adults. Variations between 0·8 and 1·2 undoubtedly occur in the opsonic index to tubercle in healthy

adults, but the average works out very near 1 in the three series that have been examined so far:—

Observer.	Number examined.	Average.
Bulloch - - - - -	84 (town).	0·96
Urwick[15] - - - -	20	1·006
Lawson and Stewart[16] - -	25 (country).	1·0

The index remains practically constant from day to day in the same healthy individual[15]; but I have noticed that vigorous exercise, such as a twelve-mile walk, undertaken by a healthy person of sedentary habit, will sometimes cause a rise from 1·0 to 1·2 or 1·3 on the following day.

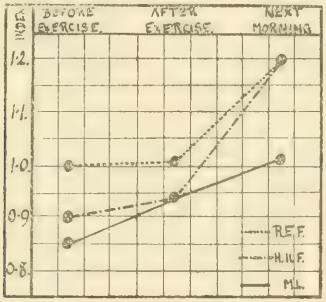


Fig. 5. *To show the effect of exercise on the tuberculo-opsonic curve in healthy individuals.*

In tuberculous disease, the index may vary from 0·2 to 2·6. In 150 cases of lupus, Bulloch[8] found an average of 0·75. In chronic cases of surgical tuberculosis, it seems to be low; 0·6 in 11 of Bulloch's[10] cases, and 0·84 in nine of mine. In cases of apyrexial phthisis it appears to be always below 1·0:—1·0 to 0·5 (Lawson and Stewart).[16]

A point of some importance is that, in tuberculous females, a depression of the index is noticeable at the menstrual period; this depression is also found in staphylococcal infections.

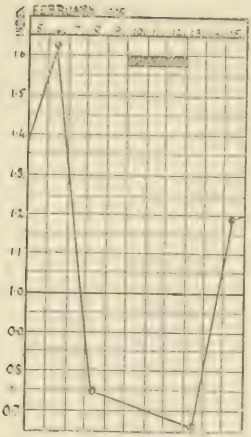


Fig. 6. *This curve shows the effect of menstruation on the opsonic index to staphylococcus albus. From a case of empyema of the frontal sinus.*

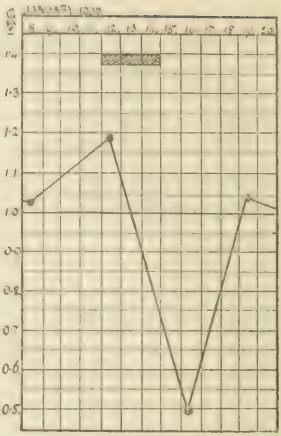


Fig. 7. *This curve shows the effect of menstruation on the tuberculo-opsonic index. From a case of genito-urinary tuberculosis.*

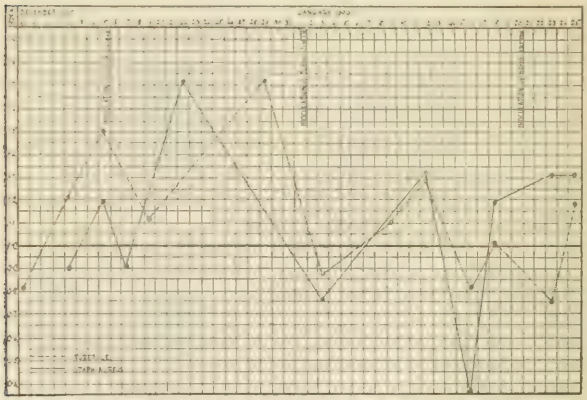


Fig. 8. *Opsonic chart of a case of psoas abscess which had become infected with staphylococcus aureus; it illustrates the great variations in the opsonic index which take place in patients that are rapidly going down hill; this patient died on February 4, 1906.*

In some cases the opsonic index undergoes great variation, being sometimes very low and at other times quite high; this indicates auto-inoculation, and may occur either while the patient is getting better, or while he is rapidly going down hill; if the variations are very marked, the latter is the most likely.

This is well illustrated by the chart shown in Fig. 8.

In chronic cases the opsonic index keeps fairly constant and is subnormal.

BACTERIAL VACCINES AND THE OPSONIC INDEX.

When a dose of tuberculin, or other bacterial vaccine, is injected, it produces a definite oscillation in the opsonic curve.[17]

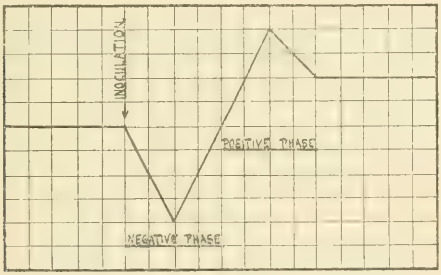


Fig. 9. *Curve showing a typical reaction following an inoculation with a specific vaccine.*

At first the index falls, then it rises to a point above its original level; again it falls, but only slightly, and is then maintained for a variable period at this higher level. The first fall is called the "negative phase" and the subsequent rise the "positive phase." Urwick[15] has noticed that there is sometimes a sharp rise before the negative phase; I have also noticed it in some of my curves.

If an inoculation is given during a negative phase, there will be a further fall, and the succeeding positive phase will be long delayed or absent; an inoculation just after, or during, the positive phase gives rise to a small negative phase, and then a positive phase superimposed on the first one.

An operation,[11] a dressing, and exercise also give rise to a negative followed by a positive phase.

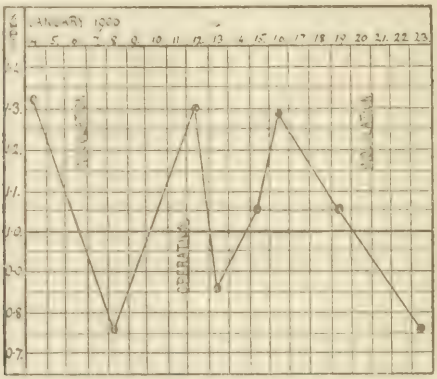


Fig. 10. *Curve showing the effect of an operation on the tuberculo-opsonic curve. The case was one of tuberculous cystitis, and the operation was Cock's operation.*

Possibly massage and the application of X-rays, or Finsen light, act similarly. Wright explains these changes as being due to auto-inoculation, and this view is favoured by the occasional occurrence of general tuberculosis after an operation.

It has also been observed that nuclein, when injected subcutaneously, and yeast,[9] given by the mouth as one large dose, will give a reaction on the tuberculo-opsonic curve similar to that produced by a dose of tuberculin.

METHOD OF TREATMENT.

The ideal aim in treatment is to obtain a cumulation of positive phases, and to avoid ever giving an injection during the negative phase. To do this, it is necessary to take the opsonic index at regular intervals, and to plot out the results on a curve; it is then easy to see at a glance whether the index is rising or falling. In staphylococcal injections, the opsonic index can be raised and maintained at a high level, but in tuberculous cases it soon falls to its original level again; in spite of this, tuberculous patients certainly do well under

the influence of a properly interspaced series of tuberculin injections.

The clinical aspect of the patient is an untrustworthy guide, although he, or she, may feel, and appear, worse during a negative phase and better during a positive phase. In some cases the negative phase is often marked by objective symptoms, for instance, in acne by a fresh crop of boils, and in gleet by an increased urethral discharge.

CHOICE OF CASE.

It is not every case that is suitable for treatment by inoculations. No one would dare to inject more poison into a patient who is already septicæmic. Again, a case whose immunising defence is breaking down, as indicated by very marked variations in the index, is unsuitable ; if more poison is added to the system, a beneficial reaction cannot be expected. The most suitable cases are those whose index is low, and whose focus of infection is strictly localised, for it is easier and more beneficial to raise a low index than to produce a rise in an index that is already high. A tuberculous patient, who has an evening rise of temperature, should be kept in bed until his temperature is normal, and then a course of inoculations can be started.

THE INOCULATION.

By the term "vaccine" is understood "a chemical substance which, when introduced into the organism, causes there an elaboration of protective substances." [18]

For inoculation, vaccines of known strength must be prepared, as the most satisfactory results are obtained by using vaccines prepared from the organism cultivated from the patient's own lesion,[19] and standardised so that a given unit of volume shall contain either the dead bodies of a definite number of bacteria, or a definite weight of bacterial protoplasm.

The vaccines in general use at the present time are simply watery emulsions of bacterial cultivations prepared in a manner somewhat similar to that already described, and, after centrifugalisation, diluted to contain some convenient number of bacteria, *e.g.*, 500,000,000 per c.c., sterilised by heating to 65° C. for an hour, and finally sealed up in capsules in doses of 1 c.c. till required. For tuberculous cases, Koch's tuberculin

(T.R.), diluted with 0·75 saline is used; this, like other vaccines, needs sterilising, as living tubercle bacilli are occasionally present in the fluid when purchased.

The inoculation must be given with strict aseptic precautions. It is convenient to use an ordinary sterilised hypodermic syringe, and to inject into the loose subcutaneous tissue of the abdominal wall, flanks, or shoulders. As a rule, there is no local reaction, but slight soreness or stiffness sometimes supervenes if the dose is a large one; the only constitutional disturbance likely to occur is a slight drowsiness lasting a few hours; there has been no rise of temperature in any of my cases, which shows how dangerous is the large dose which it is necessary to give for clinical diagnostic purposes. It is true that for a clinical reaction tuberculin T.O. is injected, but still it is a tuberculin.

In a series of herapeutic, inoculations, the first dose should be small. I give ·0002 mgr. of T.R., or 250,000,000 cocci; Wright starts with only ·0001 mgr. of T.R. If there is a good reaction it is unnecessary to increase the dose. In adults I usually find that it is better to increase the dose of tuberculin to ·0005 mgr., and of cocci to 1,000,000,000. Different patients react very differently to an inoculation; in the majority the negative phase lasts three or four days, but it may last two weeks or more.[16] Wright has shown that the bigger the dose the more prolonged is the negative phase; with a very large dose the positive phase may be completely absent. It is important to watch the negative phase with its variations in order to regulate the dose satisfactorily. A prolonged negative phase points to the last dose having been too large; where successive negative phases get longer, the dose is too large; where successive negative phases get shorter, the dose is either the correct one or is too small; if too small, the positive phases will not be well marked, and the case will not make good clinical progress. Sometimes it happens that a long negative phase occurs, or that the positive phase is absent; then it is necessary to give another but smaller dose of vaccine.

In the early part of this work, it was thought advisable to put the patient to bed for twelve hours before and after injection, but lately this precaution has been omitted, and no untoward results have ensued.

RESULTS.

The results at Guy's have so far been encouraging on the whole, in spite of the fact that many of the cases treated were regarded as hopeless from a surgical point of view. Of five cases of genito-urinary tuberculosis, three have done very well, and can be considered as completely cured ; one patient unfortunately died, and the other, from whom the main source of infection cannot be removed, is subject to relapses, in spite of opsonic treatment. One case of empyema of the frontal sinus showed marked improvement, but never got quite well. The only operation performed was the removal of the anterior ends of the middle turbinate bones, to allow freer drainage from the sinuses. If in such cases really satisfactory drainage could be established, I feel convinced that opsonic treatment would bring about a complete cure, and that the infection of other sinuses, which so often takes place during convalescence, would be prevented.

Several cases of acne have been quite cured ; in some of these the infecting organism was staphylococcus aureus, and in others staphylococcus albus. In one case both organisms were found, and the patient got well rapidly when inoculated against both, in spite of the fact that she had had the complaint for years.

Of two cases of chronic gonorrhœal urethritis, one improved rapidly, and the other remained *in statu quo ;* unfortunately, these patients were lost sight of, and treatment was not continued sufficiently long to allow of a definite opinion being formed as to its efficacy.

As the result of my observations, I consider that though treatment by vaccines stimulates the system in its resistance to infection, alone it will bring about a cure in but very few cases. Other methods of treatment must be used in conjunction with it. So long as a patient has a focus of disease, he is liable to reinfection. It is, therefore, important that such foci should be removed surgically as completely as possible, but preferably this should not be done till the opsonic index has been raised. It is strongly to be recommended that operations, and in particular those on tuberculous patients, should only be performed during the positive phase following

a preliminary injection of tuberculin. The negative phase due to the operation would then be superimposed on the positive phase of the reaction to the injection, and would be harmless; while, if superimposed on a negative phase due to an unobserved auto-inoculation, the cumulation of negative phases might easily result in general tuberculosis.

In acute infective processes nothing can be gained by inoculations, but in chronic localised infections, it is almost always possible to increase the natural resistance of the patient, and so to help nature to bring about her own cure.

One of the great obstacles to the general adoption of this method of treatment is the time and trouble in estimating opsonic indices, and another is the necessary laboratory appliances. So far, the indices have been estimated twice a week, but from a study of the curves, obtained from my tuberculous cases, it seems possible that the results would be equally good, if the index were not taken till three weeks after an injection, when, if not very depressed, another injection should be given, the reason being that it is almost impossible to raise the index in tuberculous patients, and *maintain* it at a high level, and patients progress very well with a series of negative and positive phases, provided that the positive phases are more marked, and last longer than the negative phases, a result readily obtained by regulating the size of the dose of vaccine.

With reference to the value of estimations of the opsonic index in the early diagnosis of phthisis and other tuberculous infections, all that need be said here is that a patient, whose index is below 0·8, or above 1·2, is probably tuberculous.

In conclusion, I desire to record my indebtedness to the surgical staff of Guy's for permission to make use of their clinical material, and to the Bacteriological department for facilities for work. My best thanks are due to Dr. Eyre for his various suggestions, many of which have been of great advantage to me, and for his kindness in correcting the proofs of this paper.

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BRONCHITIS AND BRONCHO-PNEUMONIA.[1]

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Whatever influence we may attribute to the influence of cold, I think we can hardly deny that it is during the prevalence of cold changeable winds, especially when accompanied by wet, that we see most cases of broncho-pulmonary catarrh. The bronchial tubes of certain predisposed persons are adversely influenced by these atmospheric changes. We are all acquainted with people who, like Mr. Jarndyce, can always tell us when the wind is in the east, speaking literally, not metaphorically.

1. Micro-organisms and other Irritants.—The air passages, even in health, contain micro-organisms such as the streptococcus pyogenes, the staphylococcus, Frankel's pneumococcus, and many others. A good deal has been written[2] to prove that all disease, especially inflammatory disease, is really beneficent in its aim, and may be looked on as a reaction on the part of the human body to protect itself from the action of irritants, whether toxic, mechanical, or parasitic. It is highly probable that the action of cold on the bronchial mucous membrane may so depress its functions as to affect the vitality of the protective epithelium, and so favour the attacks of micro-organisms, or increase the irritant effect of dust particles.

2. Importance of Nasal Respiration.—One factor in the ætiology of bronchitis, which ought to be placed at the very commencement of the consideration of the subject, is the efficiency, or otherwise, of what is known as the "nasal filter." When the nasal fossa are patent and normal nasal respiration is adequately performed, the air being thus not only warmed and rendered less irritating to the bronchi, but also purified by the removal of hosts of dust particles and microbes.

[1] Read before the Nottingham Medico-Chirurgical Society.

[2] *See* "A Conception of Disease," by Sir F. Treves, *Brit. Med. Journ.*, Vol. II., 1905, p. 1251.

I suppose that it is not necessary to advocate the early removal of enlarged tonsils and adenoids, and the correction of intra-nasal conditions, which block the air-way. Indeed, the evil done, by neglect of such remedial measures, is a matter of daily observation in patients of all ages:—first, in the case of mouth-breathing children, who are liable to recurrent bronchial catarrh; second, in increasing the liability of young adults to tubercle of the lungs; and third, in the case of the chronic bronchial affections of middle-aged and elderly people. Although the adenoid structures may have undergone spontaneous atrophy, the evil habit of mouth-breathing, once acquired, is responsible for much of the chronic bronchitis which is the practitioner's despair.

3. Dust.—No less important than the adverse influence of cold and bacteria are the irritating effects of the inhalation of dust of various kinds, and to this may often be added the depressing effects of impure air. Vegetable dust, such as is produced by cereals, or in the manufacture of linen and cotton goods, is said, by some authorities, to be as harmful as dust of mineral origin. Stone-masons' phthisis has long been quoted as a typical example of the effects of mineral dust on the bronchial tubes and fibrous framework of the lung. Such improvements as better ventilation, and wet-grinding in place of dry, have done much to lessen the amount of disease formerly caused by dust. Dr. Thomas Oliver[1] has recently pointed out that much depends on the quality of the dust inhaled. For instance, in the causation of miners' phthisis, the harm is not done by coal as coal, but by the gritty particles of rock intermingled with it; and still more intensely are these results to be observed in persons who have worked among the hard quartzite dust of the South African gold mines. Silicosis of the lung, or Rand miners' phthisis, begins with bronchitis, or sub-acute broncho-pneumonia, caused by the deposition of gritty particles in the air-tubes and vesicles. In these situations, the particles are engulfed by phagocytes, emigrated from the blood-vessels, and carried thence into the lymphatic spaces and glands, there to set up that unyielding fibrotic change, which ultimately accomplishes the destruction of the lung. Hence it is seen that the

[1] "Rand Miners' Phthisis," *Brit. Med. Journ.*, Vol. II., 1905, p. 919.

wandering cells play an important part in the development of the disease. In ordinary cases of bronchitis, not leading to such extensive changes in the lung, there is probably a somewhat similar aetiology, and the wandering cells may play an important rôle in the production of fibrosis, which is often a contributory factor in the causation of bronchiectasis.

4. Alcohol.—Much of the chronic bronchitis, with which we are so familiar is greatly aggravated, if not caused, by alcoholic excess, especially alcohol acting in conjunction with exposure, and other common causes. Thus is set up peripheral vascular dilatation, which is found in the bronchial as in the other mucous membranes. The congestion, at first temporary, in course of time becomes permanent. The bronchial tubes constantly contain an increased amount of mucus, and their resilience, and that of the lung-tissue as well, becomes impaired, hence the great liability of this class to become emphysematous. Bronchial hæmorrhage from the permanently dilated capillaries is not uncommon, and may be considerable in amount.

5. Passive Congestion of the Lung, such as that observed in mitral disease, especially mitral stenosis, is a potent cause of bronchitis. These patients easily take on a catarrh, which is very apt to descend along the lining of the air-passages, causing bronchitis and broncho-pneumonia. The strain of coughing and the increased congestion of the lungs naturally aggravate the cardiac condition, the stress being principally on the right side of the heart, which tends to become dilated. I attended a lady for many years, a sufferer from mitral stenosis. A condition of compensation and circulatory balance was fairly well maintained, except when she got a catarrhal bronchitis. These attacks were always prolonged, the cardiac action was disturbed, and did not become regular till after a considerable spell of absolute rest in bed.

6. Renal Disease.—Another important group of cases is that occurring in connection with renal disease, acute and chronic. It is important to be on the look-out for latent albuminuria in middle-aged persons who present themselves for the relief of bronchitis. Unless we recognise the renal condition, and treat it, especially by relieving arterial tension, we shall not do much for the bronchitis. Incidentally, I may

remark that one of the best ways of relieving tension is by the use of saline purgatives, either in the form of the vulgar Epsom salts, or one of the more fashionable German waters. Albuminuric bronchial catarrh probably depends on the same cause as the intestinal catarrh frequently present in the same class of case, being an attempt on the part of nature to eliminate the poison. A somewhat similar group occurs in gouty people, both those who have had overt attacks in the joints, and those who suffer from chronic joint pains, dyspepsia, lassitude, and the like. For the uric acid diathesis, which appears to include everybody nowadays, the best specifics are purgatives, plenty of pure water to drink, strict moderation in the use of flesh food, and exercise. Stout people are very apt to get bronchitis, probably because their metabolic activity is low, they are of sedentary habits, and ingest too much solid and too little liquid (or too much of the wrong sort).

7. AGE.—Infants resemble old people in being intolerant of sudden exposure to cold. In them bronchitis is common, and is very apt to lead on to pulmonary collapse and lobular pneumonia. The disease is predisposed to, and rendered more dangerous by, the co-existence of rickets, and, from this combination, there frequently arises a permanent distorsion of the chest. The proneness of rachitic children to catarrh of the mucous membranes is constantly to be seen in the out-patient room, and the same patient will turn up one week with diarrhœa or vomiting, and the next with bronchial catarrh, and so on, turn about, for a considerable time.

8. Among the SPECIFIC DISEASES, measles and whooping-cough are constantly attended by bronchitis, which is apt to be of the capillary form, or to develop into broncho-pneumonia. A mild bronchitis is frequent in enteric fever, and, in children, may take on a broncho-pneumonic character. Broncho-pneumonia is not at all frequently seen in scarlet fever. But I recently saw a case, in consultation, where this condition was diagnosed, and made the prognosis much more grave. It occurred in a little boy of eight, who had passed through a mild attack of scarlet fever, but who, when convalescent, was taken ill with throat symptoms and fever. When I saw him, there was a distinct grey membrane covering the uvula. There had been a few petechial spots over one ankle, but these were

almost faded when I saw him. Over the lungs, back and front, there were circumscribed areas, where tubular breathing and crepitations could be heard. This combination of symptoms made a diagnosis of generalised septicæmia very probable, and this turned out to be correct. The swab from the throat yielded a cultivation of mixed cocci, but no diphtheria bacilli.

The expressions broncho-pneumonia, lobular pneumonia, and catarrhal pneumonia are usually, in this country, regarded as identical in meaning, but this identity is not so absolute as is often supposed. By broncho-pneumonia we mean an inflammation of the finest bronchioles and air cells, that is to say, capillary bronchitis, extending to the alveoli. The products of the inflammatory process chiefly consist of desquamated alveolar epithelium and leucocytes, hence the name catarrhal. But the distribution of the lesion is not necessarily lobular. In the typical form it doubtless is, but the inflammation may rapidly affect large tracts of tissue until the distribution may be truly called lobar. The creeping pneumonia of influenza is of the catarrhal variety, and tends to become lobar in distribution. The influenza bacillus is found in the lesions. Other bacilli, found in catarrhal pneumonia, are the pneumococcus, diphtheria bacillus, Friedländer's bacillus, streptococcus pyogenes, and staphylococcus pyogenes. On the primary lesion, the tubercle bacillus frequently becomes engrafted, and its presence should always be suspected in frequently relapsing cases of broncho-pneumonia. This disease chiefly affects children under four years of age. Beyond that age, inflammation of the lung is generally lobar. Another peculiarity is that, after the age of four, although the liability to bronchitis continues, it very seldom leads to broncho-pneumonia, which is so commonly the case at the age of one or two.

In the ordinary secondary form of the disease, the pneumonic factor is usually added insidiously to the bronchitic, and the physical signs continue to be rather those of bronchitis than of pneumonia. Presumptive evidence of pneumonia is often to be gathered from increased respiration rate, temperature and cyanosis, together with recession, during inspiration, of the supra-clavicular, epigastric and inferior costal regions. The temperature, while frequently

reaching 104°, is markedly remittent and hectic. There is no crisis. Recovery is very slow, and liable to be interrupted by relapses.

If catarrhal pneumonia may be lobar in distribution, as we have just seen, so croupous pneumonia may take on a lobular form. Authorities of wide experience in diseases of children, such as West[1] and Holt,[2] describe a primary form of lobular pneumonia, in addition to that arising in connection with bronchitis. West especially is a supporter of the view that primary pneumonic fever takes the familiar lobar form in adults, and a lobular form in children. Bacteriological evidence is in support of this view. In primary broncho-pneumonia, the organism, most frequently found, is the same as in lobar pneumonia, namely, Fränkel's pneumococcus, while, in the secondary form of the disease, the infection is often mixed, or due to the streptococcus alone. But this distinction is not merely theoretical, or bacteriological, it has practical bearings as well. Though pneumonia of any description is bound to be a very fatal disease in children of a year or two old, we learn, on the authority of Holt, that the secondary form is more dangerous than the primary, and, in somewhat older children, we notice the same marked tendency to recovery, as we see in the pneumonia of young adults, the prognosis being distinctly better than that of secondary broncho-pneumonia at the same age. The course of the two diseases is different, and they can be recognised clinically. The one usually occurs in subjects debilitated by bronchitis, rickets, measles, or whooping cough, while the other suddenly attacks children in robust health. Like other fevers, primary broncho-pneumonia may be ushered in by convulsions, delirium, or somnolence. The temperature is high and less remittent. The duration is shorter, and the illness often terminates by crisis. Recovery is rapid, there is no great tendency to relapse, and the mortality is small. Bronchitis may accompany, but does not precede the pneumonia. Physical signs are not marked, but generally small areas can be found presenting the signs of consolidation. "The clinical symptoms are those of croupous pneumonia, but the lesions,

[1] *Diseases of the Respiratory Organs*, Vol. I.
[2] *Diseases of Children.*

those of broncho-pneumonia."[1] The tendency of children with pneumonia to develop cerebral symptoms must be borne in mind; the pulse-respiration ratio is one of the most important criteria when a diagnosis between this disease and meningitis has to be made.

The sequelæ of bronchitis are well known, the most important being bronchiectasis, emphysema, and, finally, dilatation of the right side of the heart, tricuspid regurgitation, and œdema. In chronic bronchitis, towards the end, the sputum is generally abundant, and purulent. The prolonged wheezy expiration is evidence of stasis in the bronchial tubes, and in this condition pus-forming organisms are apt to lodge and flourish. But sputum may not only be purulent but intensely fœtid in the so-called putrid bronchitis. This latter may occur in two forms, acute and chronic, the one resembling septicæmia, with high temperature, leading rapidly to death, and the other of much milder intensity, without apparent affection of the patient's general health, although large quantities of foul pus may be spat up daily, and ending, sometimes, in recovery. Decomposition of the sputum generally, although not invariably, occurs also in bronchiectasis, the reason, probably, being the stagnant condition of the fluid, which may remain for hours undisturbed in the cavity. Periodically the fœtid sputum is discharged in gushes, the morning, on first awaking, being a common time of the occurrence, the process being generally assisted, or even started, by the patient leaning over the edge of the bed head downwards. This feature of the periodic discharge of a large quantity is one of the distinguishing symptoms between bronchiectasis and putrid bronchitis, another being signs of cavity, generally at the base of one or both lungs. But a bronchiectasis may give no sign of cavity, especially when deeply placed in the lung. Dulness on percussion, distant breath-sounds and crepitations at the base of the lung, accompanied by chronic cough, and the symptoms of bronchiectasis, there being no tubercle bacilli in the sputum, are also presumptive evidence of this condition. These signs are not uncommon in children, and the disease they indicate may remain after adult life has been reached. This juvenile form of bronchiectasis frequently

[1] West.

arises from broncho-pneumonia. The accompanying peri-bronchitis and interstitial pneumonia lead to patchy fibrosis, and the pull of the contractile tissue on the bronchial tubes leads to their dilatation. The traction of the inspiratory muscles may, sometimes, as after partial collapse of the lung, aid the process, just as the same force causes compensatory emphysema. Gangrene of the lung, in which intensely fœtid sputum is expectorated, can generally be distinguished from bronchiectasis by the shorter duration and greater intensity of the symptoms. But it does not follow that all cavities at the base, discharging fœtid material, are necessarily bronchiectatic, even when tubercle can, with great probability, be excluded. Some of these probably arise from pneumonia, which has caused sloughing of a portion of lung, leaving a rugged cavity, in which putrefactive organisms find a nidus. Such a condition may remain practically stationary for many months, as in the case of a young man under my care (shown before this society), who has signs of cavity in the right postero-lateral region of the chest, periodic expectoration of fœtid stuff, and displacement of the heart to the right, owing to the loss of lung tissue. There are good grounds for regarding the case as non-tubercular.

Diagnosis.—In chronic cases accompanied by cough, a suspicion of phthisis not uncommonly arises in the patient's mind, and, may, and, sometimes, ought to arise in the doctor's. The diagnosis of bronchitis is not difficult, but the question, all important as it is: Does bronchitis mask a more serious disease? by no means always admits of easy solution. A boy, aged 4, now in the Nottingham General Hospital, was admitted with signs of general bronchitis, these disappeared in a few days, but the temperature has remained above normal a month, there being now no physical signs at all. In an adjoining bed, there is another boy, who merely has dulness at one base, due to thickened pleura, not to fluid, and a typically hectic temperature. In both these cases, signs of tubercle are nil, or nearly so. Still tubercle is in all probability present in both, possibly in the bronchial glands. In adults, there may be such a degree of bronchitis as to mask the signs of a small patch of pneumonia, as in the case of a young man, recently in the General Hospital. On admission, he was thought to be

suffering only from bronchitis, but there was a degree of prostration and pyrexia hardly consistent with this view of the case. In a day or two, pneumonic consolidation of the bases of both lungs was found. I may here point out the gravity, which a pneumonia case derives from the development of bronchitis, either concurrently, or, more especially, during its course. The patient, in this case, expectorates a large quantity of frothy mucus, differing from true pneumonic sputum, and is, of course, in danger of asphyxia, owing to accumulation in the tubes. The addition of a pneumonia to pre-existing bronchitis is not quite so serious.

I am frequently asked for an opinion in cases supposed to be consumptive, who, I venture to say, as often as not, are suffering from some other disease. On the other hand, I have seen several cases, all young women, who were thought to have bronchitis, but who really had acute tuberculosis. The symptoms developed rapidly like a catarrh, there were moist sounds all over the chest, without dulness on percussion. The diagnosis rests on the prostration, the high, remittent temperature, the character of sputum, which may, however, be absent, and the quality of the crepitations. The latter are finer, more rhythmical, than the moist rales of bronchitis, and are heard principally with inspiration.

Senile cases of phthisis, are often put down to bronchitis. I have seen well-marked phthisis at 60, and I think at 70, only this patient only attended once, and I did not make sure of the diagnosis. It is true that these cases often have generalised bronchitis, but with this there may be found at one apex some high-pitched breathing and sharp crepitating rales, and the sputum will probably contain tubercle bacilli. The occurrence of hæmoptysis is, by no means, necessarily evidence of tubercular disease. It may occur, sometimes, in large amount in bronchiectasis, or even in simple chronic bronchitis, especially in alcoholics.

TREATMENT.—It is not necessary to discuss, except very briefly, the treatment of bronchitis. A mild winter, such as that of 1905-6, lightens the work of our profession, and eases the lot of many who suffer from winter catarrh. They tell us a little defiantly that the weather suits them. We can only send a very small proportion of these sufferers

to winter in suitable climates; the majority must remain at home, to be treated under the best conditions that can be obtained for them. During an acute attack, the patient should be kept in a warm moist atmosphere and be given suitable expectorant and diaphoretic remedies; for pain and soreness of the chest mustard and linseed may be applied, or one of the modern substitutes for the old-fashioned poultice. From two of these, I have received some assistance, called respectively "thermogene" and "thermofuge," which, while aiming at the same result, might be thought from their names to possess diametrically opposite effects. When cyanosis threatens from accumulation of mucus, emetics are useful, especially in children. If the right side of the heart becomes distended, an adult patient may be bled from the arm to an extent of 8 and 10 ounces. According to West, this should be done freely, or not at all. During acute attacks of children, and old people, opium must be rigidly avoided. A remedy which is often most useful is belladonna. It may be given freely in the broncho-pneumonia of children, and in many forms of bronchitis in adults in the secreting stage. I recently gave the drug, 7½ minims every four hours, in a case of double pneumonia complicated by bronchitis and asthma. I was somewhat alarmed to find the sputum diminish from 8 ounces to less than 2 in 48 hours, but the patient was greatly benefited, and ultimately got quite well. For broncho-pneumonia with persistent high temperature, West recommends a hot mustard bath, at 106–110°. I am afraid our insular prejudices would not allow us to put into practice the hydro-therapeutic measures, advocated by the authors of the pulmonary sections of Nothnagel's *Encyclopædia*. Dr. Hoffmann recommends cold compresses to the thorax, and for capillary bronchitis of children "*cold affusions*, the patient standing, or sitting, in lukewarm water; they (*i.e.*, the affusions) play the first *rôle* in pediatric practice, on account of the ease and convenience of administration."[1] While condemning the poultice, the same author recommends wet compresses, covered with wax paper, or rubber cloth, to be continued until a miliary eruption breaks out—in fact, a mild degree of Matlock crisis. Counter-irritation is most valuable,

[1] Nothnagel's *Encyclopædia*, "Diseases of Bronchi and Lungs," p. 144.

and may be best applied by means of stimulating liniments containing ammonia or turpentine.

For subacute cases, able to go about, a little opium, combined with mild expectorants is the best treatment. Many of these people do themselves harm by violent and needless coughing as they imagine they must at all cost "get something up." They should be told to restrain their coughs, and by simply following this advice immediate improvement often follows. Menthol lozenges are an invaluable remedy; by anæsthetising the laryngeal branches of the vagus they diminish the tendency to reflex cough. For bronchorrhœa, ammonia, terebene, balsamic drugs, and stimulant and disinfectant inhalations may be used. For bronchiectasis, I have used capsules of the essential oil of garlic, as recommended by the late Dr. Vivian Poore, with some improvement, but no absolute cure. For this disease, excellent results are claimed for the somewhat unpleasant treatment instituted by Dr. Chaplin, namely, by creosote vapour. All the openings and air-holes of a small chamber are stopped up, and the patient, clad in a washable smock, and his orbits closed by watch-glasses, plastered on, to protect him from the irritant and odorous properties of the vapour, is placed therein. Crude creosote is then heated over a lamp, until the air is thick with the fumes. The treatment extends in daily sittings over some months, and though severe, is the most efficient yet proposed. For chronic dry catarrh, especially when accompanied by high pulse-tension, iodide of potassium is often useful.

AFEBRILE TYPHOID FEVER.

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AFEBRILE typhoid fever is fairly well recognised, and now that Widal's test is so frequently employed, it may be found to be less uncommon than has been supposed.

The importance of the recognition of such cases cannot well be over-estimated, for a fatal termination may be due to their improper treatment, and to giving unsuitable food too early in convalescence.

Osler mentions these cases, but says that he has no personal knowledge of them. He, however, classifies separately, under the head of abortive forms, those cases which present fever at the onset, lasting only a week or so. Clifford Allbutt's system devotes only about half-a-dozen lines to them.

It is with the idea that such cases are more frequent than is at present believed that I am reporting three instances in which fever was of very short duration: and the fatal case shows that, though the febrile period was short, the local process in the bowel went on to ulceration and even to perforation. It is important, therefore, that patients should be suitably dieted during the first month or so of the disease, although they appear to be cases of the abortive type, and the usual rule of giving solid food a week or ten days after the temperature has become normal must be altered. If this had been done in the third case I report, it is possible that the termination might not have been unfavourable.

I have been careful to exclude any case which might possibly have been one of "ambulatory typhoid" by only giving those in which the onset of the disease could be definitely determined. The duration of the fever in the first case was only five days, and in the second it was less than a week.

The important fact that the ulcerative process in the bowel may continue, though the fever has been only slight or absent, is borne out by a case of afebrile typhoid fever

reported by Sir Dyce Duckworth in THE PRACTITIONER, in which sloughs were passed by the bowel on the 42nd day of the disease, although the temperature had only been above normal during the first four days of the illness.

Isabel W., a married woman, aged 34, with a healthy history, on August 17, 1902, began to feel ill, and vomited; the next day she had cold shivers, headache, and abdominal pain; and was admitted, on August 19th, to the London Temperance Hospital. The headache was severe, and the tongue coated and brownish. The bowels were constipated. The abdomen was flaccid and not tender, the spleen was enlarged, there was no eruption on the skin. There were a few bronchitic signs at the bases of the lungs posteriorly.

The temperature on admission was 101·4 F., which fell next day to 99 F., and afterwards was rarely over 98·4, except on one or two occasions, when it rose to 99·2. The pulse varied between 60 and 70. After a week the blood gave a definite reaction to Widal's test. The patient's symptoms were very slight, and the diagnosis rests almost entirely on the Widal's test, the other chief features being the severe headache at the onset, the signs of bronchitis in the chest, and the splenic enlargement. The temperature was taken every four hours during the first week in order that any fever of short duration should not escape observation.

Alice T., aged 4 years, was admitted into the North Eastern Hospital for children, July 31st, 1905. She weighed 2 stones, and had been a healthy child except for measles a year previously. There was a doubtful history of congenital syphilis. She had had a cough for 8 days previously, and for a week had suffered from headache and constipation. She was anæmic. The tonsils were reddened and enlarged. Temperature 98° F. on admission. The tongue was furred and the bowels constipated, being opened by enemata. A few rhonchi were heard at the bases of the lungs. Heart normal. Pulse 120. Abdomen normal in size, no spots, spleen not palpable, but two days later could just be felt below the costal margin. Widal's test negative. A week later Widal's test gave a positive reaction, but no other signs had appeared. The temperature on one or two evenings rose to 100° F., but was more generally normal until on August 12th, when it rose to 103° F., and continued to rise

each day to about this level, falling in the early morning to normal. Two days later, a discharge appeared from the left ear, and two abscesses appeared on the scalp. These soon subsided under treatment, the temperature again fell to normal, the child gradually improved in general condition, and was discharged early in September. It was discovered that the mother died of enteric fever while the child was in hospital, and that the father and three other children were being treated for it in hospital. This history, with the general symptoms and the positive reaction of the blood to Widal's test, shows fairly conclusively that the child was suffering from enteric fever, which was the cause of the otitis media which was present.

The last case is one which I saw while acting as locum tenens for a general practitioner whilst a senior student at hospital. The father of 4 children, who were suffering from typical typhoid fever, complained to me of feeling ill and having pains in his legs. His temperature was 101° F. and the pains resembled those of rheumatism from which he had previously suffered. There was some headache and furring of the tongue. The action of the bowels was as usual. I treated the patient as if suffering from typhoid fever, keeping him in bed with a milk diet. I also prescribed salicylate of soda. In two days the temperature became normal and did not rise again, but during the remaining ten days of my attendance, milk diet and rest in bed were insisted upon. Some bronchitis developed at the bases of the lungs, and a few rose spots appeared on the abdomen. Early in the third week of his illness, three days after I had returned to University College Hospital, he was brought to the hospital with signs of perforation of the bowel, and died in a few hours. At the autopsy many ulcers were found in the intestine, one of which had perforated, causing the fatal termination. It appeared that he had been allowed a more generous diet when my attendance terminated.

THE ÆTIOLOGY OF ECZEMA: WITH SPECIAL REFERENCE TO THE RECENT LITERATURE ON THE SUBJECT.

By J. M. H. MacLEOD, M.A., M.D., M.R.C.P.,

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THE subject of eczema has attracted so much attention during the last half century that it might with reason be imagined that the last word had been said upon it, and that, as a subject for further investigation, it had become barren and threadbare. In spite of the facts, however, that eczema is one of the commonest of skin affections, that it has been more or less carefully studied by generations of physicians, and that it has formed a subject for discussion and controversy at almost every Dermatological Congress, there is probably no subject, connected with cutaneous diseases, on which there is at present greater diversity of opinion. Bacon, had he lived in these later days, might well have been thinking of eczema when he described "medicine as a science which had been more professed than laboured, and yet more laboured than advanced, the labour having been rather in a circle than in progression." In this contribution, I propose to discuss the ætiology of eczema in the light of the more recent communications upon it, with the object of defining, if possible, the present state of our knowledge on the subject. It is a common observation that the more we know of diseases of the skin, the fewer are the entries which are made in our case-books with the heading of eczema, and that, with increased experience in differential diagnosis, we have come to recognise that various affections, which were formerly placed in the elastic group of the eczemas, are entities with a well-defined ætiology and pathology, which merit a distinctive name. Notwithstanding this process of pruning, there is still a group of clinical characteristics, which we designate as eczema, but this clinical picture varies so greatly in the minds of different observers that, before referring to the problems of its ætiology, it will be

advisable to attempt to define it. In the present state of our knowledge, a precise definition of eczema does not seem to me to be practicable, and it would seem preferable to describe briefly the complex of symptoms to which the name is generally applied.

Eczema is a non-contagious superficial inflammation of the skin of the nature of a catarrh. It generally begins suddenly with the formation of ill-defined erythematous patches, associated with burning and itching, which rapidly fade, being replaced by an eruption of small reddish papules situated on the more or less inflamed base. In some cases the initial erythema may be so transient as to pass unobserved, and, instead of being followed by papular eruption, it may be succeeded by a scaly patch. The papules, when carefully examined by a lens even soon after their appearance, will generally be found to be translucent at the apex owing to the presence of a commencing vesicle. This gradually increases, and in a few hours the whole papule becomes transformed into a superficial vesicle. New lesions of this type rapidly appear and either remain discrete, or coalesce to form patches, or even large sheets of eruption. In situations in which the skin is naturally thin, these vesicles soon rupture, and the coagulable serum, which is one of the clinical characteristics of the disease, oozes on the surface and dries to form a crust. Where the skin is thick, as on the palms of the hands, the vesicles persist longer without rupturing, and tend to coalesce to form blebs, which also break and ooze in the course of a few days. In this way the patches of vesicular eczema become transformed into raw weeping surfaces, which, when the discharge begins to dry up, become covered with crusts. On the other hand, in less acute cases, the papules with their vesicular puncta may not develop into complete vesicles, but may abort and dry up, forming scaly patches. The eruption in all its stages, but chiefly in its papular phase, is associated with burning, tingling, and itching, or other subjective symptoms, which lead to scratching, and this in turn to the aggravation of the irritation, to excoriation, and to the secondary inoculation of pus-organisms. This greatly alters the clinical picture of the eczema by superimposing impetigo. In suitable circumstances and

with suitable treatment, the eruption may disappear, and the more acute the attack the better the prognosis. On the other hand, the disease may become more or less chronic, and persist in the form of dry scaly patches, associated in certain regions, such as the palm of the hand and the sole of the foot, with marked thickening of the horny layer of the epidermis, which tends to crack and form deep fissures.

The characteristics, which serve to indicate the various phases in the course of eczema, may be thus briefly summarised :—

(*a*) The initial erythema ; transient, sometimes absent.

(*b*) The papulo-vesicles and the patches they form.

(*c*) The itching, burning, and the secondary effects of rubbing and scratching.

(*d*) The oozing and the formation of the crust.

(*e*) The stage of dessication, desquamation, and healing.

The clinical picture of this disease varies considerably in different individuals, owing to a diversity of circumstances, such as (1) the situation of the lesions, whether they are on the face, trunk, or limbs ; (2) the type of skin, whether it is smooth and delicate as in childhood, thin and atropic as in old age, or tough and thick as on the labourer ; and (3) the existence of a previous pathological state of the skin, such as might be induced by impetigo, ichthyosis, and, perhaps, seborrhœa. Seborrhœa is the oily condition of the skin, dependent on a flux of the sebaceous glands, or, as Unna believes, of the sweat-glands, which forms the basis of the inflammatory affection of the skin, characterised by the presence of greasy scales, which we label in this country, "Seborrhoic dermatitis," and which in France is designated by the term "Séborrhéide." The question of the relation of seborrhœa to eczema, which has been rendered so confused by the introduction by Unna of the term Seborrhoic eczema, might almost be said to be the crux of the present position with regard to the definition and ætiology of eczema. Certain writers, such as Leredde, for example, would divide eczema into two classes, the form in which vesicles occur in the epidermis (vesicular eczema), and that in which we have squames, or fatty crusts (seborrhoic eczema).

While admitting that eczemas may be engrafted on the basis of a seborrhoic dermatitis, and that the virus of the latter may be superimposed on an eczema, I consider that seborrhoic dermatitis should be separated clearly in the mind from eczema, since it seems to differ from the latter clinically, pathologically, and in its ætiology, and in this contribution I will endeavour to dissociate them.

NATURE AND CAUSATION OF ECZEMA.

Broadly speaking, there are at present four opposing theories with respect to the nature and causation of eczema, namely, (1) that it is a parasitic disease, (2) that it is due to a variety of irritants, both external and internal, acting in a predisposed individual, (3) that it is the result of a nerve-derangement, and (4) that it is not a disease any more than prurigo is a disease, but is simply a cutaneous reaction to irritants in a predisposed individual, in other words, it is a symptom. Under these headings this subject may be conveniently discussed.

PARASITIC ORIGIN OF ECZEMA.

One of the strongest advocates of the parasitic nature of eczema has been Unna of Hamburg. In the lesions of eczema, he found a type of coccus which tended to arrange itself in mulberry-shaped masses, and to which, in consequence, he applied the name of morococcus. This microbe he believed to be pathogenic, and claimed to have succeeded in producing the disease by inoculating it on the skin. This theory was strenuously supported by Leredde, of Paris, who also regarded the morococcus as the pathogenic agent, but considered that various predisposing causes were essential before the presence of the micro-organisms on the skin could determine the disease, such, for example, as local irritation, surface abrasions, nerve troubles, visceral derangements, and other like causes. Considerable doubt, however, was felt in the validity of the inoculation experiments, and it was suggested, on the one hand, that what was inoculated was impetigo rather than eczema, and, on the other, that the morococcus was not a new micro-organism, but one of the common denizens of the skin, and

was a staphylococcus of low virulence, possibly identical with the S. epidermidis albus of Welch. Gradually the view that eczema was caused by this single micro-organism was abandoned, and Unna himself has now given it up. It was at the International Medical Congress in Paris in 1900 that the theory received its most severe check, and in the discussion which took place on the subject, almost everyone who expressed his views was opposed to it. Sabouraud, who led the opposition, went so far as to assert, and has continued to do so in his recent writings, that the vesicle of eczema is at first sterile, and that when micro-organisms are present they are secondary contaminations which transform the vesicles into pustules. It may be said that the parasitic theory of the nature of eczema is, for the moment, dead, and, apart from the fact that no definite microbe of eczema has yet been established, there are several considerations which make it difficult to accept a local parasitic cause. For example, eczema is a disease which may be associated with outbreaks of eruption almost as sudden and generalised as an exanthem, a fact which is difficult to explain on the basis of a local parasitic causation. Again, there is no definite evidence that eczema is a contagious or inoculable disease, though various other affections, with which eczema has been from time to time confused, such as impetigo, intertrigo, and most probably seborrhoic dermatitis, are local parasitic affections and contagious. Besides, on this hypothesis how could symmetrical lesions on such places as the elbows be explained by contact? On the whole, the local parasitic theory of the causation of eczema, apart from being non-proven, seems to raise more difficulties than it solves, and it will require more conclusive evidence in its favour than it has had in the past before it can be accepted.

THE TOXIN THEORY OF THE CAUSATION OF ECZEMA.

The view that eczema is the result of the action of various toxins, or irritants on the skin, has attracted more support than the microbic theory. A large number of toxins have been from time to time cited as the cause. These may be divided into those which act on the skin from without, and those which circulate in the blood and reach the skin from within.

(A) *Toxins and Irritants acting first externally.*

Very many toxins and irritants are known to produce in the skin of individuals, who possess the necessary idiosyncrasy towards them, a severe local dermatitis, which is clinically and histologically indistinguishable from eczema. Among these are the poisons of certain toxic plants, a number of trade irritants such as sugar, strong antiseptics used in dressings such as iodoform, and various drugs applied locally like arnica. Various writers have insisted on the distinction of the different forms of traumatic, or trade dermatitis, from eczema, not from the point of view of the clinical feature of the local lesion, but on the ground that in the trade dermatitis the eruption disappears soon after the irritant ceases to operate, and does not spread beyond the region affected by the irritant. According to the French school of dermatologists, true eczema cannot be created by external irritation, and, though unable to distinguish the irritation-dermatitis clinically from eczema, they still maintain that it is a different affection. A distinction of the nature of the above is more arbitrary than real, and it must be conceded that the border line between a trade dermatitis and true eczema is far from well defined.

Again, a traumatic dermatitis is not infrequently the starting point of ordinary eczema; the following not uncommon type of case, which recently came under my observation, will serve to illustrate this fact. A gardener, as the result of handling the Primula obconica a couple of years ago, became afflicted with a severe dermatitis, indistinguishable from acute eczema and confined to his hands and arms. The local affection disappeared under treatment, and the patient was warned of the danger of touching various poisonous plants. These he has carefully avoided, but in spite of that he is now subject to generalised attacks of ordinary eczema apart from any apparent external cause, and has continued a martyr to ordinary eczema ever since. In such a case, the obvious cause of the local dermatitis, or localised eczema, was the toxin of the Primula obconica, but the cause of the subsequent generalised eczema is hypothetical. It has been suggested that the poison is absorbed into the general circulation from the local lesion, and so causes new patches to develop in various situations

on the skin, and it may be pointed out, in corroboration of this view, that not infrequently, before an extensive attack of acute eczema develops, there is some general disturbance, such as restlessness or feverishness, such as might result from the presence of toxins in the blood. Against it, however, is the almost insuperable difficulty of believing that such toxins could persist in the blood or the tissues indefinitely. The other explanation is that the toxin acts at first directly on the skin, and sets up the local dermatitis, which is the clinical evidence of the reaction of the skin to the irritant, and, secondly, that it produces lesions on other parts of the skin by acting reflexly through the nerves. This, too, is open to the adverse criticism that by it it is difficult to explain the continuance and recurrence of eczematous patches long after the original local dermatitis has healed, and the irritant, which was responsible for it, has been removed.

(B.) *Toxins circulating in the Blood.*

Various toxins circulating in the blood have also been blamed for causing eczema. It has been said by some that the toxins acted directly on the skin, and by others that they acted reflexly through the nerves. Of these the toxins from the alimentary tract have been most frequently incriminated; such toxins as have been long known to be common causes of urticaria and certain erythematous eruptions. That various food toxins and the products of imperfect metabolism and mal-assimilation are capable of aggravating an attack of eczema, or even of determining a recurrence of it, when once the eczematous habit has been established, almost everyone will be prepared to admit, but that they can produce an eczema *de novo* has yet to be established.

But there are certain other toxins which are even less clearly defined which have been regarded as causing eczema. These may be best considered under the heading of the "diatheses," for there are not a few observers, chiefly in France, who at present regard eczema as the cutaneous manifestation of certain general defects of health, to which the somewhat vague term diathesis has been applied. The chief diatheses which are held responsible are the so-called

gouty, diabetic, rheumatic, and scrofulous diatheses, and obesity.

The introduction of the diathetic hypothesis of the causation of eczema is an old story, and dates back to the writings of Biett early in last century. Although it has been frequently regarded as a cloak for ignorance, and has been discarded from time to time, yet it has been periodically revived, and at the present time seems to be again asserting itself. The theory was a protest against the tendency of regarding skin affections too much in the light of local conditions, which at one time dominated the Vienna school. As in the case of the food-toxin theory, however, it is much easier to prove that the so-called gouty state and glycosuria are predisposing rather than exciting causes of the disease. No one, who has seen many cases of glycosuria, will deny a relation between it and the eczematous patches with which it is frequently associated. These patches, however, are generally secondary to pruritus, and are induced by scratching, or result from the local irritation of the saccharine urine, and are not the direct result of toxins in the blood. Neither can scrofula and obesity be regarded as direct causes of eczema, though they may determine a weak state of resistance of the skin, as they do of other organs, and so act as predisposing causes. One of the most recent definitions of eczema is that it is a "polymorphic dermatitis symptomatic," not of a known diathesis, but of one which is "not yet defined."

THE NERVE THEORY OF THE CAUSATION OF ECZEMA.

It has frequently been asserted that eczema is the cutaneous manifestation of a certain type of nervous derangement. This view was suggested by the apparent relation of attacks of eczema to mental worry, anxiety, and other forms of nerve strain, and by the frequent occurrence of the disease in patients of a definitely neurotic type. Bulkley, in a recent lecture on the "Relation of Diseases of the Skin to Internal Disorders," records a case in point. A woman who suffered from eczema of the face and hands was the executive officer of a charitable institution. Every Tuesday she had a visit from the Ladies' Committee, which caused the work on that day to be trying and severe. On Wednesday there was always either

a fresh outbreak of the eruption, or an aggravation of what existed, with excessive burning and itching. Everyone is familiar with such cases. Still they do not prove that the nerve strain, or neurosis, is other than the predisposing cause or aggravating factor in the disease. No actual changes have as yet been conclusively demonstrated in the peripheral nerves in eczema, and the view that it is some form of tropho-neurosis is simply a hypothesis.

THE THEORY THAT ECZEMA IS A CUTANEOUS REACTION.

The nerve theory of the causation of eczema naturally leads on to the reflex, or reaction, theory which is at present gaining ground. Brocq, of Paris (*Ann. de Derm. et de Syph.*, 1903, T. iv., No. 3), is one of the strongest supporters of this view. He considers that since no definite micro-organism, or toxin, has been established as the precise cause of eczema, it should no longer be regarded as a specific disease, but rather as a reaction of the skin in certain predisposed individuals to a number of causes. For him there is no such thing as eczema the disease, there is only eczematisation the symptom. Arthur Hall, of Sheffield, has lately published an exhaustive study on the ætiology of infantile eczema (*Brit. Journ. of Derm.*, 1905, XVII., p. 161), which he believes to be similar to adult eczema, but of greater value in studying the question of ætiology, than eczema in the adult, since such matters as nerve-strain, anxiety, and shock can be eliminated, the diet can be more carefully watched, and the beginnings of the disease more thoroughly studied. As the result of an enquiry in 60 unselected cases, he concludes that eczema is a reaction of the neuro-cutaneous apparatus to external irritation, which is absent in most people, and is only called forth by exceptional irritants in many, or at times of great nervous irritability, while in a few it is so readily aroused, even by the ordinary external stimuli of daily life, that they are constantly afflicted. Others consider that the cutaneous reaction is induced reflexly through the nervous system, and that, given the necessary predisposition, comparatively little may determine it, but that the most common cause is not external irritation, but rather internal irritants,

such as food toxins, or such reflex irritation as may be associated with uterine derangements, or with chronic bronchitis and asthma. The close relation which exists between what may be called the neuro-cutaneous reaction and asthma has frequently been commented on, and so many cases have been observed in which outbreaks of eczema alternate with asthmatic attacks as to suggest that the asthma resulted from a condition of the bronchial mucosa analogous to the catarrh of the skin, and that when the one was active, it had an inhibiting action on the other somewhat after the manner of a counter-irritant.

CONCLUSIONS.

Almost all writers on the ætiology of eczema, however much they may differ from each other in their views regarding the pathogenesis of the disease, are at one in considering that some special predisposition or idiosyncrasy on the part of the individual is essential before one or other of the various agents, which have been incriminated, can produce eczema or eczematisation. Such factors as age, sex, race, and climate seem to have little bearing upon it. Heredity, on the other hand, may predispose in so far as it is responsible for a hereditary delicacy of the skin, and states of enfeebled health, such as may be caused by alimentary troubles, kidney disease, and nerve derangements, may all act as predisposing causes by lowering the resisting power of the skin, and rendering it more liable to react to irritants. There are also various pathological conditions of the skin which structurally predispose to eczematous attacks, such, for example, as xerodermia, ichthyosis, and senile skin.

Given the proper state of predisposition, whether it be congenital or acquired, various irritants seem capable of causing the affection. But there is the greatest diversity of opinion with regard to the irritants, whether they are external, internal, or both. The exponents of the diathetic theory, or of the view that toxins from the alimentary tract are responsible for eczema, emphatically deny the power of external irritation to produce the disease, while those, who support the external irritant theory, believe that the ætiology of the disease can only be explained on that basis. Hall, for example, asserts that external

irritants are entirely responsible for infantile eczema, which he describes as "occupation eczema of infancy." The predisposing cause of this he believes to be the state of instability of the neuro-cutaneous apparatus of the infant owing to the sudden change from a "sub-tropical aquatic life in the amniotic fluid to a terrestrial life in a temperate zone," and the actual causes to be such external irritants as cold, imperfect drying, soaps, dust, etc. For the adult the predisposing cause might be a state of over-stimulation or irritability of the nervous system, and the actual cause some form of mechanical irritant such as friction, irritating fluids, sunlight, etc. The problem, however, is still *sub judice;* perhaps in the light of future researches it may be solved, until then it is wisest to study each case as it presents itself, to avoid hasty generalisations, and to keep an open mind on the subject.

A SIMPLE OPERATION FOR PILES.

By R. M. HENRY RANDELL, M.D. (Lond.), M.R.C.S. (Eng.),
Beckenham.

Rather more than ten years ago I devised a method of operating for piles, which has many advantages over the methods usually employed, and, as I have up to the present time operated on more than 300 cases, I feel justified in drawing attention to it.

The *modus operandi* is as follows :—The patient's rectum is cleared out by an enema, and he then sits over hot water for a little while in order to bring the piles well down.

He is anæsthetised ; the piles are seized with forceps, and ligatured as tightly as possible close to their bases with stout catgut. If any pile is too large to be included in a ligature it is best to transfix it, and tie it in two portions. Silk is not so suitable for this purpose, since it is apt to cut through. The piles are then cut off with scissors so close to the ligatures that the latter fall off. This completes the operation ; a morphia suppository is inserted, and the patient put back to bed.

The first thing next morning the patient has a dose of "white mixture," which is repeated in a couple of hours if it has not acted by that time. The result is a comfortable loose motion, with very little, if any, pain. The following morning the "white mixture" is repeated, if necessary, and the patient may be allowed to get up and move about.

In the great majority of cases the patient can go about his business again in a very few days, certainly in less than a week. This is no small advantage, inasmuch as a large number of patients cannot afford to give up the three weeks necessary for recovery after other operations for piles, *e.g.*, with clamp and cautery.

This quick recovery is due to the following facts :—

1. The stout catgut ligature is so tightly tied that it ruptures the internal coat of such blood vessels as it includes ; hence, when the piles are cut off, and the ligature falls away, there is no hæmorrhage.

2. There are no ligatures or sutures left in the rectum to act as irritating foreign bodies. There are only so many clean wounds, which heal up very rapidly.

3. The use of a saline aperient the next morning clears away any blood that there may be in the rectum, and prevents any hyperæmia.

4. No opiates or astringents are used, and consequently enemata, with all the attendant pain and discomfort, are unnecessary, nor is there any inhibition of micturition.

It has been urged by some that, with this method, there must be great liability to serious hæmorrhage. As a rule there is none. On only one occasion did a patient bleed copiously, and in his case hæmorrhage was easily arrested by plugging the rectum for 24 hours.

There does not seem to be any liability to recurrence. I have not as yet had to operate on a case a second time, although several of them had been previously operated upon by other methods before coming under my care.

Prize Essay.

THE TREATMENT OF HÆMORRHOIDS.

By WM. G. SUTHERLAND, M.B., C.M.,

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Of all the minor ailments which the general practitioner is called upon to treat, there is, perhaps, none which is more prevalent than piles, and none in which the results of medication are so unsatisfactory as regards a permanent cure. There are several reasons why the medical man does not get these cases in their earlier stages, before thickening of the walls and hypertrophy of fibrous tissue have taken place. A feeling of modesty keeps such patients away; they think that they will be subjected to an ocular examination, put to considerable pain and discomfort, or that an operation will be advised. Having exhausted the resources of the chemist, of remedies obtained by post from advertisers in the press, or when repeated bleedings alarm them, then it is that they consult the medical man. Often, indeed, it is for the secondary constitutional symptoms induced that they seek advice. A point to be carefully borne in mind is, that in hæmorrhoids the character of the pain is reflex, and that patients often refer this symptom to the wrong organ, to wit, to the uterus, bladder, kidneys, or testicle.

PREDISPOSING CAUSES.

In attempting to lay down a rational therapeutic treatment for hæmorrhoids, the predisposing causes must first be considered. These are of two kinds, (1) anatomical, or hydrostatic, and (2) mechanical.

1. *Anatomical.*—The hæmorrhoidal veins, together with the veins communicating with the portal system, *have no valves*, and consequently have to sustain the entire weight of the column of venous blood going to the liver. They are situated between the mucous and muscular coats of the rectum, run in the direction of its long axis, and interlace with one another by transverse or circular veins. Thus, having but little support,

they are much exposed to mechanical compression, either from (1) the interior of the gut, (2) from outside its walls, or (3) from muscular straining in defæcation, or in passing water. Piles, therefore, must be looked upon, not as a local disease of the rectum merely, to be treated by local applications, but as a symptom, or effect of obstruction at some other part, perhaps remote, the removal of which is necessary to effect a cure. There is free anastomosis between the three hæmorrhoidal veins, which form a closely interwoven meshwork. But for the fact that part of the blood from the rectum is returned through the venæ cavæ, piles would be even commoner than they are.

Anything which tends to congestion in the portal system and obstructs the free return of venous blood through the portal veins to the liver, will predispose to hæmorrhoids. The commonest cause, of course, is oft repeated and prolonged *compression from within* the bowel, caused by the accumulation of masses of fæcal matter, the result of chronic constipation. But fibrous, or malignant disease of the rectum may also be a cause, and might possibly be overlooked if a digital examination is not made. *Compression from without* may be caused by the pressure of the gravid uterus or pelvic tumours. Muscular action also acts by compressing the veins, such as *straining* to pass water in stricture, enlarged prostate, or stone of the bladder. Straining at stool, either from constipation, or from the abuse of aloetic purgatives, will also cause piles. The great majority of the so-called "patent" pills, so widely advertised, contain aloes as their chief purgative ingredient. Finally, amongst predisposing causes may be mentioned a sort of hereditary tendency, which exists in some individuals, due to want of development of the vein walls.

The treatment may be discussed as (1) general and dietetic, (2) palliative, (3) radical.

GENERAL AND DIETETIC.

(A) *General.*—Scrupulous cleanliness should be enjoined; hot fomentations are soothing, and the use of carbolic soap is antiseptic and deodorant. A sponge, or cotton wool, is much better to use than paper. Sedentary habits should be avoided, if possible, and cold baths and tonics may be prescribed for

debilitated persons. When the piles come down, the patient should be instructed to carefully replace them in order to prevent ulceration or strangulation.

(B) *Dietetic.*—In the obese, enjoin more exercise, lessen the quantity of food taken, if that seems indicated, and prohibit stimulants, beer, stout and the use of sugar, or much farinaceous food. When the diet leaves too little residue, and the digestive organs are good, a larger amount of salads and boiled green vegetables may be partaken of, for they tend to prevent constipation. The large amount of cellulose which they contain passes unchanged through the alimentary canal. For a similar reason, other foods such as stewed prunes and figs, coarse oatmeal porridge and brown bread, which contain indigestible and irritating particles, may be advised. If the stomach will tolerate them, raw fruits, such as apples, pears and tomatoes. Excessive tea drinking is injurious, but very many women go to quite the opposite extreme, and take far too little fluids. Such people may, with confidence, be advised to take a tumblerful of hot water with a slice of lemon on rising in the morning, and the same quantity at bedtime. Their fluid intake should average a pint, or a pint and a half at least *per diem.*

PALLIATIVE TREATMENT.

Palliative treatment may be (1) medicinal, (2) local. Our aim in medicinal treatment should be directed towards diminishing pressure, and thus indirectly relieving congestion in the hæmorrhoidal system. Accumulations of fæces in the bowels must not be allowed to form, and a daily action of the bowels should be obtained by means of mild aperients, such as one or two drams of conf. sulph. or conf. sennæ at bedtime. The confection of black pepper is credited with having a stimulating action on the mucous membranes of the rectum, and may be given twice or thrice in the week. Compound liquorice powder is a harmless laxative, but it forms a very bulky dose, objected to by many people on this account. In the obese, too, its sugar is contra-indicated, and, as its virtues depend entirely on its sulphur, an improvement would be effected by substituting oil of fennel for fennel fruit, and saccharin for sugar, thereby reducing the bulk by one half.

Cascara sagrada, in the form of liquid extract, cascara cordial, pills, compressed tablets and capsules, acts as a mild tonic laxative, having an action chiefly on the large intestine. The system does not become habituated to its use, and it is best administered in divided doses rather than in one single large dose. As prescriptions to be taken over considerable periods the following answer admirably :—

Mist. Laxativa.

Ext. Cascar. Sag. liq.	1 dr.
Ext. Glycyrrhiz. liq.	1 dr.
Sodii Bicarb.	5 grs.
Aq. Chlorofor.	ad. 1 oz.

University.

Mist. Cascar. Sag.

Ext. Cascar. Sag. liq.	30 mins.
Ext. Glycyrrhiz. liq.	30 mins.
Spt. Ammon. Aromat.	20 mins.
Aq. Chloroform.	ad. 1 oz.

St. Thomas's.

The second forms the most elegant mixture, being bright and free from deposit. The addition of a minim of oil of cassia to each ounce improves the flavour. Sometimes, when the action of the liver is sluggish, as in the plethoric and obese, a draught of Apenta water, or Carlsbad salts, taken in the early morning may be advised. A. Schmidt (*Münch. med. Woch.*, Oct. 10, 1905), advises six drams of agar-agar daily, as a means of making the stools more voluminous and securing a regular habit. However well German stomachs tolerate this treatment, it is quite certain that, in this country, the private practitioner will still have to trust to sulphur and cascara sagrada.

LOCAL TREATMENT.

Local applications consist in the use of astringents and sedatives, ointments, suppositories, lotions, and injections.

1. *Ointments.*—Amongst ointments, Ungt. Gallæ. and Ungt. Gallæ. cum Opio have long held honoured places. Of late years, however, Ungt. Hamamelis B.P. and Adrenalin ointment have been much prescribed. Galls and Hamamelis, with lanoline, form the basis of a widely-used quack remedy for piles called Buer's Mullah. Sir James Sawyer puts great

faith in an ointment made from the celandine plant (ranunculus ficaria). Excellent white sedative and astringent ointments are compounded of:—

(1)

Adrenalin	0·03 grm.
Liquid Paraffin	3 grms.
White Vaseline	12 grms.
Oil of Geranium	3 drops.
Lanoline	15 grms. Mix.

(2)

Cocaine Hydrochlor.	20 grs.
Hazeline	4 drs.
Lanoline	4 drs.
Benzoated Lard	2 oz. Mix.

External piles may be simply smeared over with ointment applied by a pledget of cotton wool. Allingham's ointment introducer may be used to apply ointments to internal piles, or, better still, a tin collapsible tube for holding the ointment is fitted with a vulcanite rectum pipe. These tin tubes form a cleanly and portable means of treatment.

2. *Lotions* of lead acetate, ferrous sulphate (1 gr. to the oz.); ferric perchloride (10 mins. to the oz.), gallic acid, tannin, hamamelis tincture or liquid extract, are sometimes used, either hot or cold, for external piles. Adler, of New York, uses the following as a paint:—Fluid extract of hamamelis, fluid extract of hydrastis, compound tincture of benzoin, of each, 16 parts; tincture of belladonna, 4 parts; and carbolised oil, 5 per cent., 32 parts.

3. *Injections* of ice cold water with adrenalin, or one of the hæmostatics just mentioned, may be useful to check serious bleeding, 2 ozs. are thrown up and left there.

4. *Suppositories* are sedative and astringent. Ferric perchloride, 1 in 40; bismuth, morphine and cocaine; galls and opium; hamamelis with cocaine; iodoform, 5 per cent., c̄ cocaine, 2 per cent.; tannin, 10 per cent.; adrenalin, 10 mins.; ranunculus ficaria (celandine); suprarenal (= 3 grs., fresh gland) to check bleeding; and suprarenal with morphine for painful piles, are combinations in use. R. Timmermann, of Hanover, praises anusol suppositories. Anusol is bismuth iodo-sesorcin sulfonate, a powerful astringent and antiseptic,

but whether it has any advantages over the foregoing is doubtful.

An "attack of piles" is an expression used by many people to denote that their piles (perhaps of long standing) have become inflamed and painful. Rest in bed with the buttocks raised should be insisted upon, for these inflamed piles are usually thrombosed. An ice-bag, hot boric fomentations, or linseed poultices may be applied after the lower bowel has been thoroughly cleared by a simple enema. If pain is great, a quarter-grain morphine suppository may be inserted. Should these measures fail, the pile which is giving trouble should be incised and the clot turned out, when prompt relief will usually be obtained.

INDICATIONS FOR OPERATION.

Palliative treatment, if strictly and intelligently carried out by the patient, will undoubtedly, in very many cases of simple, uncomplicated piles, end in their ceasing to give rise to trouble. But sometimes every remedial measure fails, the patient becomes anæmic from loss of blood, and the question arises, when should operation be advised? When the result of pregnancy, or symptomatic of disease of the liver, bladder, uterus, stricture, or enlarged prostate, it is inadvisable to operate, also in piles with little pain, or bleeding, and where the general health is uninfluenced. In hepatic cirrhosis, indeed, hæmorrhoids act as a safety valve provided by nature; so long as they bleed so long will there be no marked abdominal dropsy. Great loss of blood causing anæmia, much pain and profuse mucous discharge, together with undermining of the general health, are the indications for operative interference. The method by carbolic injection may be regarded as quite obsolete in this country. In America the clamp and cautery are looked upon with more favour than they are in England, where the ligature is regarded as the best operation for the majority of cases of internal piles. Ballard, of New York, in an exhaustive paper in the *Medical Record*, March 29, 1902, gives his verdict in favour of clamp and cautery. Whatever the method chosen, the patient requires to be prepared beforehand by a brisk purgative given the day previous to, and a simple enema given just prior to operation.

NOTES FROM FOREIGN JOURNALS.

HÆMOPHILIA.

Professor Sahli publishes in the *Zeitschrift f. klin. Medizin* some observations on the causes of hæmophilia, made in four cases of bleeders recently under his care. He altogether rejects the old idea of easily lacerable vessels, and the hypertrophy of the left ventricle so often found. In his cases, he found that hypertrophy did not increase the blood-pressure. The examination of the morphological constituents of hæmophilic blood only showed small deviations from normal: leucocytes normal or somewhat decreased, polynuclear lymphocytes somewhat decreased, mononuclear somewhat increased, and also, in one case, the eosinophil cells: the total blood-count did not differ from the normal. In addition to this, the amount of water contained, the osmotic pressure, and the degree of alkalinity were in each case found to be approximately equal to normal. The amount of fibrin contained was within the limits of health.

Some interesting experiments were made as to the time required for coagulation. Under ordinary conditions, hæmophilic blood required double the time, or even more than that, for coagulation than healthy blood. When, however, the bleeder had been bleeding for some time, ten minutes or so, his blood coagulated very quickly in one minute, whilst that of a healthy man under the same conditions required several. The difference was most marked when the blood was removed from the site of the hæmorrhage. Hæmophilic blood, under these conditions, was found to possess the power of making normal blood coagulate more quickly when added thereto.

It was noted that, as in normal subjects, the coagulative power increased as bleeding went on, so in bleeders this took place in an increased degree, but was still not sufficient to bring the bleeding effectually to an end. In one of his cases, Sahli found that the bleeding, after proceeding freely for some minutes, could be stopped by means of a simple suturing of the wound.

He found also that the addition of defibrinated normal blood brought about much quicker coagulation in hæmophilic blood, and, moreover, that the amount required to produce this effect was very small, suggesting a sort of ferment-action. On the ground of this and several other considerations, he formed the opinion that the blood of bleeders is lacking in "thrombo-kinase," or zymoplastic substance, or else that this is secreted in too small an amount and too slowly from the injured walls of the vessels and the blood-cells. Local attacks, such as the propensity to hæmorrhage into the joints, bleeding from the kidney, etc., he attributes to local deficiencies in the walls of the blood-vessels.

The advice he gives about treatment is quite uninfluenced by the above researches and results, for he warns expressly against the injection of zymoplastic substances into the blood-vessels. He considers the best and only means for lessening the tendency to bleeding is plenty of mixed

diet and bodily exercise. For injuries he recommends a 2 per cent. gelatine dressing, or a 1–2 per cent. solution of calcium chloride, but he sets his hopes upon the local use of adrenalin. He condemns the use of perchloride of iron and injections of ergotine.

THE TREATMENT OF CORYZA IN INFANTS.

L. Ballin, in *Therapie der Gegenwart*, insists on the necessity for the direct treatment of coryza in infants instead of the expectant method hitherto in practice, as this affection not only exercises a most disadvantageous effect upon the act of nutrition, but in addition to that increases the danger of lung complications. For the purpose he recommends the use of suprarenal preparations. In each nostril, alternately, for two or three minutes, is placed a small pledget of absorbent wool, which has been dipped into a solution of adrenalin, 1 per 1000. The anæmia produced in the mucous membrane decreases the amount of swelling, which fact is made evident by the amount of secretion which is blown out of the nostril. The effect lasts on an average for only three or four hours, so that it is necessary to repeat the procedure three or four times a day, or immediately before each meal. After three or four days, the number of applications can be lessened. The formation of watery secretion by that time has discontinued, and crusts begin to form. These are treated with white precipitate ointment. The continuance of the temporary treatment will depend upon the state of the case, being kept up so long as there is superabundant secretion.

If a troublesome rhinitis is present, shown by the passage of blood-stained mucus and purulent secretion, the adrenalin treatment must be supplemented by the use of a ½–1 per cent. solution of nitrate of silver. Once a day after the adrenalin application, one drop of the silver solution should be introduced into each nostril. As a stock solution of adrenalin (1 per 1000) very easily spoils and makes its use very expensive, the author recommends the use of hemisine tablets, one of which, dissolved in 5 c.c. of water, yields a 1 per 1000 solution.

The results obtained by the author were extremely good, for in the first place the absorption of food was greatly increased, and in the next lung troubles were averted in many cases. Out of a number of infants under operation, 12·5 per cent. of these, to whom the adrenalin treatment had been applied, were attacked with bronchitis, while 44·4 per cent. of untreated cases had the disease. Even in syphilitic coryza a favourable effect was produced, not only locally, but also upon the great mortality which falls upon these unfortunate infants.

TREATMENT OF CORYZA BY FORMIC ALDEHYDE.

In the *Concours médical*, Lacroix describes a method which, according to him, has the best results. He prescribes formic aldehyde (formol 40 per cent.) ʒiss. in a wide-mouthed bottle. To be used for inhalation.

The patient holds the open bottle immediately below each nostril, as if about to use a smelling-bottle, and inspires gently. There is produced in the nasal fossæ, and generally also in the forehead, cheeks and nape of the neck, showing the penetration of the formic vapours to the frontal, maxillary and sphenoid sinuses, a sense of smarting and tingling, intense enough to

cause a slight lachrymation, and a running of mucus from the nose. As soon as this sensation becomes painful, the inhaling is stopped for a few moments, and then renewed two or three times more. This is done every hour, or less often, according to the degree of severity of the coryza.

The advantages of this method of treatment are:—before all, its simplicity, all that has to be done is to take the stopper out of a bottle which may be of any size or shape, and to inhale from this as from a scent-bottle; with one or two drachms of formol a cold in the head can be treated for several years; its innocuousness, for formic aldehyde, used in this manner, has no inconvenience attached to it; and its efficiency, for these inhalations bring about very good clinical results. Some patients preserve with the greatest care their little bottle of formol, and have recourse to it whenever a cold in the head threatens, and for many years they have never been disappointed of a good effect.

These inhalations are an excellent remedy for acute rhinitis in general, and for a cold in the head in particular.

DIET IN BILIARY LITHIASIS.

Dufourt discusses in *La Presse médicale* the indications which must be met, and gives four conditions which must be complied with.

First, to prevent, or greatly diminish, the infection of the biliary tracts. To this end, choice must be made of foods such as milk, kephir, fresh cheese, or curds, which will reduce to a minimum intestinal putrefaction. Experience has for a long time proved that milk is the food for choice in these cases.

Secondly, to maintain the normal composition of the bile. No diet has any influence in this connection, and experiments on animals show that the cholesterine of calculi does not proceed from the ingesta. However, as soaps make it soluble, fats should be given, and the action of the liver, which produces biliary acids must be stimulated, as these acids themselves dissolve cholesterine. Meat furnishes the greater part of these acids, and must therefore be given to a moderate extent, always with the addition of green vegetables and fruits.

Thirdly, to induce an abundant secretion of bile. Albuminoids give the best results; carbohydrates are very inferior. In this respect eggs are to be recommended.

Fourthly, to make the biliary excretion as constant as possible. During the time which elapses between the end of digestion of one meal and the following meal the biliary tracts are a closed cavity, for bile is not secreted during this time, so that the biliary circulation is, as a rule, arrested between eleven o'clock at night and eight o'clock in the morning. More frequent meals are therefore necessary.

As there are two types of lithiasis, the indications will differ for each variety.

1. Lithiasis with frequent colic. The irritation of the gall-bladder must be allayed, and the infection of the biliary tracts lessened. Milk will be the food for choice while waiting for surgical intervention. It must be given in small quantities at a time, frequently repeated, until the acute stage has passed off.

2. Lithiasis with occasional colic. Overfeeding must be avoided, as well as all dishes difficult of digestion. Meat should be allowed in small quantities; the distinction between red and white meats appears to be quite unimportant. Fish can take the place of meat, which, however, should not be given at more than one meal a day. For the evening meal, eggs may be substituted. Soups, thick and thin, peas, lentils, and potatoes are allowed, but bread and pastry must be limited to very small amounts. For fats, fresh butter and yolks of eggs must be used, excluding cooked butter, lard, oil, and fat meats.

Herbaceous vegetables will, like ripe fruits, be allowed freely; but spices, vinegar, and alcohol must be forbidden. Five meals a day are recommended, but in every case one must be guided by the tolerance of the patient.

A NEW METHOD OF REDUCING DISLOCATIONS OF THE THUMB.

Cavalier-Bénezet has devised an ingenious and very simple method for reducing this dislocation by forcible extension, which, in some cases, is very difficult to accomplish. Collins' forceps are used with this intent, but this is not an instrument which every practitioner keeps in his case, whilst a strong pair of scissors is quite sufficient to produce the same result. To give one of the author's examples, in a case of dislocation backwards of the left thumb, Farabeuf's forceps had twice been applied without success, and it had been decided to perform tenotomy of the glenoid ligament when Cavalier Bénezet asked to be allowed to try with scissors. Using for his purpose a pair of scissors, such as is used for cutting out boots and trousers, he used the rings as he would have done a pair of forceps. He passed one ring over the thumb down to the base, and then endeavoured to complete the extension, aiming to force out the sesamoid bones, and combining traction with some lateral movements. Two cracks were heard, and reduction was easy. The scissors used were like the large scissors used by tailors, with bent rings and a large space for the thumb. Any pair of strong scissors resembling these would offer the same advantages, thus sparing the practitioner the expense of a special instrument. (*Journal des Praticiens.*)

DYSPEPSIA DUE TO FERMENTATIONS.

Lecturing on this subject at the Hôpital Beaujon, Prof. Albert Robin, selected two typical cases, a man and a woman, on which to base his remarks. The male patient has painful crises three hours after a meal, followed by burning pains, eructations, and eventually by vomiting of food and bilious matters. There is no question of gastric hypersthenia, for, in that affection, vomiting and eructation are exceptional, and, moreover, in the case under consideration, taking a meal does not relieve the pains as happens in hypersthenia, but they persist until the next crisis. Other symptoms present are a dirty tongue, indifferent appetite, loss of flesh, constipation, splashing in the stomach, which is filled up with gases and liquids, and meteorism of the abdomen. The examination of the gastric juice shows a lessening in the amount of free HCl (·05 gram instead of ·50 gram), of combined HCl (·10 gram instead of 1·10 gram) increase in total acids of

fermentation (·55 gram instead of ·10—·15 gram), and increase in the amount of HCl combined with ammonia bases (·80 gram), the last showing that the process of fermentation especially affects albuminoid materials. In the case of the woman, a similar train of symptoms is present, but she has total loss of appetite, diarrhœa, headache and migraine, being in fact in a condition of neurasthenic depression. No free HCl is found in the gastric juice, the combined HCl is greatly diminished, fermentation acids are increased, and there are traces of HCl combined with ammonia bases. In this case fermentation affects more especially the carbohydrates.

The treatment of this fermentative dyspepsia consists in giving food which is not easily fermented, in avoiding gastric stasis, and in effecting stomachic asepsis, but not that effected by naphthols and betols. It is a question of attacking the supernumerary ferments without interfering with the action of the soluble ferments (pepsin, ptyalin, etc.). In addition, care must be taken to regularise the gastric secretion.

In the first place, it is necessary to forbid the inclusion in the diet of any fermentable albuminoids, *e.g.*, milk, eggs, meat, and fish. The necessary amount of albumen must be supplied by the use of nitrogenous vegetables in purées (broad-beans, kidney-beans, peas, and lentils). Other vegetable purées will be added, as well as food pastes; bread must not be given. The food must be well cooked, and prepared with water and salt, fresh butter is added when serving. Cooked butter has the disadvantage of covering the food particles with a layer of fat, thus allowing them to remain exempt from the action of the digestive juices. Fresh butter, added when serving, never penetrates into food in so complete a fashion. For drink pure water is to be taken, and after the meal the patient takes a hot aromatic infusion, and, in addition, one of the following powders in a little water:—

℞ Sodii Bicarb.
Magnes. Hydrat. - - - āā ʒj.
Sacchar Alb.
Cretæ Præp. - - - - āā ʒiss.
Ess. Anisi vel Menth. Pip. - - - ♏xv. M.
Ft. Pulv. xij.

Or,

℞ Magnes. Hydrat. - - - - - gr. xxv.
Sacchar. Alb. - - - - - gr. xxv.
Sodii Bicarb. - - - - - gr. xv.
Bismuthi Subnit.
Cretæ Præp. - - - - āā gr. xij.
Codeini - - - - - - gr. $\frac{1}{12}$.
Ess. Anisi vel Menth. Pip. - - - ♏iss. M.
Ft. Pulv. j.

About the time when the gastric crisis occurs the patient will take another of these powders.

Lactic fermentation is to be treated by the action of fluorides—

℞ Ammonii Fluoridi - - - - gr. iij—v.
Aq. destill. - - - - - ʒx. M.
One tablespoonful to be taken during the mid-day and the evening meals.

If butyric fermentation is present, use must be made of the double iodide of bismuth and cinchonidine, known as erythrol:—

℞ Erythrol. - - - - - - gr. ½–¾.
Magnesiæ Levis - - - - gr. iss.
M. Ft. pulv. j.

To be taken in the middle of each meal.

This salt liberates nascent iodine in the stomach, which acts very effectively even in the minute dose given.

In the case of gaseous fermentation, the best drug to use is an iodised sulphur, first obtained by Prunier, which contains a large amount of sulphur with a small quantity of iodine. A cachet, containing gr. iss–ijss, must be given in the middle and at the end of each meal.

The constipation present in the first case must be treated with laxative pills containing aloes as a basis; saline purgatives are contra-indicated.

When gastric intolerance and vomiting are extreme, it may be necessary to resort to complete rest of the stomach for twenty-four or forty-eight hours, but, as a rule, it will be sufficient to give the following:—

℞ Picrotoxin. - - - - - gr. $\frac{1}{12}$.
Alcohol pro dissolv. - - - - q.s.
Morph. Hydrochlor. - - - - gr. $\frac{1}{2}$.
Atropiæ Sulph. - - - - gr. $\frac{1}{60}$.
Ergotin. - - - - - gr. xv.
Aq. Laurocerasi - - - ℥ss. M.
Ft. Mist.

Filter after mixing.

To take 5 drops before each meal in a teaspoonful of water. Not more than 25 drops to be taken in one day.

Lavage is a good remedy for gastric stasis accompanied with pain: but it is a temporary measure only, for if repeated too often it risks bringing on fatigue. R bin orders it occasionally, but is more often content to give an emetic, which empties the stomach, and at the same time wakes up its contractivity. He gives about 24 grains of ipecacuanha powder, divided into three doses, taken at quarter-hour intervals.

For the second case, in which the carbohydrates rather than the albuminoids ferment in the stomach, there must be given before meals a claret-glass full of infusion of quassia and five to eight drops of tincture of nux vomica, or a tablespoonful of the following:—

℞ Strychniæ Sulphat. - - - - - gr. ss.
Aq. destill. - - - - - - ℥x.

The diet must be chiefly animal. Grilled meats, fish, boiled or scrambled eggs, and cooked green vegetables must be given; but neither bread nor farinaceous food is allowed.

As a practical point, it is difficult to determine from clinical examination whether it is the albuminoids or the carbohydrates which ferment. The diets must be tried in turn, if the first does not succeed.

The same medicines will be given, powders, erythrol, and iodised sulphur, the last two in alternate periods of four days. In addition, the patient must drink two or three claret-glasses of malt beer at meals, or take a small quantity of maltine afterwards.

If the headaches persist after the digestive functions are properly re-established, Robin orders:—

℞ Pulv. Guaranæ - - . - - gr. iv.
Caffeini - - - - - gr. ¾–iss.
Ext. Cannabis Indicæ - - - - gr. ⅛. M.
Ft. Pulv. j.

To be taken at the onset of an attack of headache or migraine.

The general weakness will be relieved by the use of hypodermic injections of the glycero-phosphate of soda:—

℞ Sodii Glycero-phosphatis - - - - ʒvj.
Aq. destill. (Steril.) - - - - - ʒiij. M.
Ft. Mist.

One injection of 15 minims to be given daily for eight days. (*Journal des Praticiens.*)

THEPHORIN—A NEW DIURETIC.

Among the means for producing increased diuresis, the xanthin preparations are being very generally used, and, of this large group, only two with their derivatives really come into consideration for practical purposes. These are theobromine, or di-methyl xanthin, and theophyllin, also known as theocin, which has the same chemical composition as theobromine, but a different structural formula. Of these theobromine is distinguished by having a smaller effect upon the central nervous system. From each of these substances a series of double salts has been obtained, which have been proved to influence the secretion of urine, partly through solvent effects and partly through increased action. Thephorin comes into consideration as the newest member in the chain of these combinations, in which theobromine has been united with formate of sodium to form a double salt soluble in water; the former providing the diuretic effect, while the latter is a relatively indifferent substance.

This double salt is completely analogous to diuretin, but formic acid has been introduced in place of salicylic acid. Formic acid has been recommended by several French observers, not only for its diuretic properties, but also for its general tonic effect so that thephorin may, as a matter of course, be placed as a preparation on a level with other double salts of theobromine now in such general use. An exhaustive series of experiments has been carried out by Dr. Th. A. Maas in the Pharmacological Institute of the University of Berlin. The results are published in full in the *Therapeutische Monatshefte* (April 1906).

Thephorin easily dissolves in water, especially in warm water, forming a clear, weakly alkaline fluid, which gets cloudy on standing, for the theobromine contained is precipitated under the influence of the CO_2 present in the air. The solubility is such that it is easy to make a 10 per cent. solution.

Maas carried out experiments on rabbits, mice, and guinea-pigs, and, on the results so obtained, he considers that the drug is fully worthy to be classed with other well-known diuretics, but clinical experience must be forthcoming before judgment in full can be pronounced.

Reviews of Books.

NOTES ON NEW EDITIONS.

A System of Medicine by many Writers. Edited by Dr. THOMAS CLIFFORD ALLBUTT and Dr. HUMPHRY DAVY ROLLESTON. Vol. I., pp. 1209. London: Macmillan & Co., Ltd. 25s. net.

In order that this excellent work may keep pace with the advances in the knowledge of medicine which are continuously being made, the editors have decided to revise and bring out one volume a year, each new volume corresponding with one of the first edition, which appeared in 1896. This second edition is really more than a mere revision, for fresh subjects have been introduced, many articles have been entirely re-written, and others have been very considerably extended. The first article in the present volume, is an entirely new contribution by Professor Clifford Allbutt and Dr. Payne. It is on the History of Medicine, and is exceedingly interesting. Many of those writers who contributed to the first edition have passed away, but their contributions have been revised by Professor Woodhead, Dr. Andrews, Sir Lauder Brunton, and Dr. Hamer. The first volume contains the Prolegomena, while some of the Acute Infections, such as cholera and plague, have disappeared from the present volume. We are informed, however, that they will be considered under the section on Tropical Medicine.

The Theory and Practice of Medicine. By FREDERICK T. ROBERTS, M.D., B.Sc., F.R.C.P. Pp. 1368 + 14. London: H. K. Lewis. 26s. net.

THE medical profession is certainly indebted to Dr. Frederick Roberts for re-writing his well-known book on medicine. The tenth edition is in two volumes, and has been entirely re-written by Dr. Roberts himself, who thus gives to the profession practically a complete summary of his clinical teaching and vast experience. Many subjects have been dealt with more fully, and new ones have been introduced. It will be noticed, however, that for the first time the section on Diseases of the Skin has been omitted. This seems to us a wise proceeding, for such an extensive and prominent speciality cannot be adequately treated of in a general treatise of the kind before us. It is a book which we can with confidence recommend to those practitioners who require a good book of reference, or to those who may be reading for a high university degree.

The Diseases of Children, Medical and Surgical. By HENRY ASHBY, M.D. Lond., F.R.C.P., and G. A. WRIGHT, B.A., M.B. Oxon, F.R.C.S. Eng. Pp. 929. London: Longmans, Green & Co. 21s. net.

THE first edition of this excellent work was published about sixteen years ago, and in the meantime four editions have appeared. We have to congratulate the authors upon the fifth edition before us. The facts set forth are mainly based upon their personal experience, and we cannot fail to draw attention to the inestimable advantage of having both the medical and surgical diseases of children so fully dealt with, as they are here, in a single volume. Many chapters have been completely re-written,

and a great deal of new matter added. There are many new figures, and a very excellent "three-colour" photograph of a case of tuberculous dermatitis forms the frontispiece. The work may be confidently recommended to medical men engaged in active practice, as one of the most trustworthy books dealing with the diseases of children.

The Diseases of Infancy and Childhood. By HENRY KOPLIK, M.D., Attending Physician to the Mount Sinai Hospital. Pp. 885. London: Henry Kimpton. 25s. net.

IN this, the second edition of Dr. Koplik's well-known work, the author has taken the opportunity of bringing the information contained in it abreast of the advances made in recent years. All the various sections of the book have been revised, and some of them completely re-written. The section upon Infant-feeding, which is excellent, has been remodelled, in order to give those methods which are practical, and which can the more readily be carried out by the medical practitioner. The author is to be congratulated too upon the excellence of the sections upon the Physiology and Pathology of the new-born, in each instance he has gone into great detail. The section, dealing with the Specific Infectious Diseases, has received extensive additions, and the articles upon Typhoid Fever and Meningitis have been recast. Many new illustrations, from original drawings and additional charts, have been introduced. One important feature of the book is the list of references to authorities, which is added after the various sections, and which considerably enhances the value of the work as a book of reference.

The Diseases of Infancy and Childhood. By EMMETT HOLT, M.D., Sc.D., LLD.; Professor of Diseases of Children in the College of Physicians and Surgeons (Columbia University), New York. Pp. 1174. London: Sidney Appleton.

DR. EMMETT HOLT'S excellent book is so well known, and so extensively used by senior students and practitioners of medicine, that it needs no description. The third edition has been thoroughly revised and enlarged, alterations have been made in almost every chapter, but the principal changes are to be found in the articles upon Hypertrophic Stenosis of the Pylorus, Diarrhœal Diseases and Dysentery, Cerebrospinal Meningitis, Mental Defects, Chondro-Dystrophy, Status Lymphaticus and Diphtheria. Most of the chapters upon these subjects have been entirely re-written, while some appear for the first time in this edition. There are 241 illustrations, including eight coloured plates, many of the old ones having been replaced by better ones, and about 25 new illustrations have been introduced. In the preparation of this volume, the needs of the practitioner have been kept in mind, and to him we can confidently recommend the present work.

Principles of Bacteriology. By A. C. ABBOTT, M.D., Professor of Hygiene and Bacteriology and Director of the Laboratory of Hygiene, University of Pennsylvania. Seventh Edition, Enlarged and thoroughly revised. Pp. 689. London: H. K. Lewis. 12s. 6d. net.

IN the early portion of this book, a general account of bacteria is followed by minute instructions dealing with sterilisation and preparation of the various nutrient media.

Next there follows a chapter devoted to general and special methods of staining, and here there are interspersed many practical suggestions.

The second portion deals with the individual morphology and cultural characteristics of the more important pathogenetic organisms, to which are added notes on inoculation and protective sera.

The question of immunity occupies the third section, the various views being shortly and clearly stated, and many references given.

Lastly, we have short chapters on the bacteriological examination of water and air, and the testing of disinfectants.

The book is well illustrated and clearly written, and forms, in our opinion, an excellent introduction to the study of bacteriology.

Appendicitis, Its Pathology and Surgery. By CHARLES BARRETT LOCKWOOD, F.R.C.S., Surgeon to St. Bartholomew's Hospital, &c. London: Macmillan & Co., Limited. Pp. 342. 10s. net.

THE second edition of this excellent monograph upon appendicitis will be welcomed by all operating surgeons. The general plan of the first edition has been retained, but many new observations and several excellent micrographs have been added. As is well known, this book is practically a record of the observations and experience of a surgeon, who has spent much time and labour in studying the various morbid conditions of the appendix, and we can, therefore, with confidence, recommend it to all young surgeons. The index is much more copious than it was in the former edition.

Heath's Manual of Minor Surgery and Bandaging. Revised by BILTON POLLARD, F.R.C.S., Surgeon to University College Hospital. London: J. and A. Churchill. Pp. 409. 6s. net.

THIS little work, originally written for the use of house-surgeons, dressers, and junior practitioners by the late Mr. Christopher Heath, has already gone through twelve editions, a fact which speaks volumes for the popularity and the excellence of the book. The present, the thirteenth edition, has been thoroughly revised and brought up to date by Mr. Bilton Pollard, while the original character of the book has been maintained. We believe that the book has completely fulfilled the purpose for which it was intended, and think that no recently-qualified man should be without such an excellent guide to his surgical work,

A Manual of Operative Surgery. JOHN F. BINNIE, A.M., C.M. Aberdeen, Professor of Surgery, Kansas State University. Second Edition, revised and enlarged. Pp. x + 655. London: H. K. Lewis. 12s. 6d. net.

THE need for a second edition of this book, within a year of its publication, affords a good criterion of the general appreciation in which it is held. As before, such operations as amputations, ligation of vessels, and excisions of joints, which are fully described in the usual text-books, receive no mention.

The remaining operations of surgery are dealt with in a laudably clear and concise fashion, the author usually indicating his preference for some one operation, in every case, in which many are described, together with his reasons for such preference. The book is thoroughly up to date, and

the illustrations, with which it is richly embellished, are well reproduced and of great explanatory value.

We think that, in describing the operations for malignant disease of the breast, the author has hardly laid sufficient stress upon the fact that the tumour, and not the breast, should form the centre of the operation.

In the description of the various operations upon the gasserian ganglion, and upon the brain, the use of adrenalin as a hæmostatic is not mentioned, although it is of considerable advantage to the surgeon.

We are glad to note that, although the author fully describes Dollinger's operation for the excision of tuberculous glands in the neck, he considers it likely to be "difficult, dangerous, and incomplete," and with this statement we are in full accord.

The book is one on which we can bestow the highest praise. It should be of great value to every junior operating surgeon.

A Treatise of Diseases of the Anus, Rectum, and Pelvic Colon. By JAMES P. TUTTLE, A.M., M.D., Professor of Rectal Surgery in the New York Polyclinic Medical School and Hospital, &c., &c. Second Edition. Pp. xviii and 963. London: Sidney Appleton.

THOUGH many minor alterations have been made in the second edition of this work, it still retains the form in which it first appeared, and has not been appreciably increased in size.

The development and structure of this portion of the intestine are discussed at length in the first chapter, and the malformations which occur form the subject of the second.

The third chapter deals with the methods of examination and diagnosis, and here great stress is laid upon such aids to diagnosis as Kelly's specula and their various modifications. Importance, too, is given to the microscopical and chemical examination of the stools, a procedure to which too little attention is apt to be paid.

In the section on anæsthesia, which is one of those which have been re-written, we note that ethyl chloride is claimed to be practically without danger. In view, however, of the increasing list of mishaps due to that anæsthetic, we feel that such a statement is regrettable. It tends to minimise those precautions and preparatory measures which are, without doubt, almost as necessary in the case of ethyl chloride as in that of any other general anæsthetic, except, perhaps, nitrous oxide.

The remaining three-fourths of the volume are devoted to the special diagnosis of various morbid conditions and their treatment.

Great care has been devoted to the subject of constipation, and the questions of after treatment and late complications of operations have also received full attention.

The book is written in a very readable style, the type and excellent illustrations helping very largely to this end.

A Manual of Physiology with Practical Exercises. By G. N. STEWART, M.A., D.Sc., M.D. (EDIN.), D.P.H., Professor of Physiology in the University of Chicago. University Series. Pp. 911. London: Baillière, Tindall & Cox. 15s. net.

THE volume before us is the fifth edition of Dr. Stewart's well-known manual, which has now been completely revised, and in many parts

re-written. Much new matter has been added to the chapters dealing with the blood, digestion, and the central nervous system. The size of the book has not, however, been increased, as smaller type has been used. There are 305 illustrations and two excellent coloured plates. The book can safely be recommended to medical students who are reading for the higher examinations in physiology, and practitioners will find it a handy and useful reference book.

Essentials of Human Physiology. By D. Noël Paton, M.D., B.Sc., F.R.C.P. (Edin.). Pp. xix and 425. Edinburgh and London: William Green and Sons.

Dr. Noël Paton in the second edition of his book admirably carries out the purpose to which he applied himself in the first, namely, to put before medical students, as succinctly as possible, the essential facts of human physiology, and to lay special stress upon those parts of the science, which are of cardinal importance in medicine and surgery. The present edition is brought up to date, some sections having been extended and rearranged. The print is good and the diagrams clear, and those practitioners, who desire to have a really useful book on human physiology, will find the present one admirably suited to their requirements.

Landmarks and Surface Markings of the Human Body. By Louis Bathe Rawlinson, M.B., B.C. (Cantab.), F.R.C.S. (Eng.). Second Edition. London: H. K. Lewis. Price 5s. net.

The best proof of the value of this book is the early appearance of this, the second edition, only about twelve months after the first. This edition contains some alterations and additions, which enhance its value. In the topographical anatomy of the abdominal viscera, the simplest and most practical method is used, viz., the "planes," first described by Dr. Addison. The text is very clear and concise; the diagrams useful, numerous, well executed, and clearly explained. The book must prove of great value to any student, who wishes to become familiar with the more important landmarks of the human body, and to such it can be confidently recommended.

Chavasse's Advice to a Mother on the Management of her Children, and on the Treatment on the moment of some of their more pressing Illnesses and Accidents. Sixteenth Edition, revised and largely re-written by T. D. Lister, M.D. (Lond.); Physician to Out-patients, Royal Waterloo Hospital for Children and Women; Physician to the Mount Vernon Hospital, &c. Pp. 454. London: J. and A. Churchill. 2s. 6d.

A new edition of this popular and exceedingly useful book is sure to be welcome, and it goes without saying that every mother should possess a copy of it. Some changes, which will be appreciated, have been introduced in the present edition, the most important of which are:—The section on the hand-feeding of infants has been entirely re-arranged and re-written throughout; the important question of milk supply has received greater attention; the description of natural feeding of infants at the breast has been revised, and formed into a separate section. Hygiene has naturally received more extended notice, and the prescriptions of the last edition have

given place to an Appendix, containing lists of useful simple remedies and appliances. The Index, so necessary in such a work as this, has been enlarged, and the usefulness of the book consequently enhanced.

Lectures on Clinical Psychiatry. By Dr. EMIL KRAEPELIN, Professor of Psychiatry in the University of Munich. Authorised translation from the second German edition, revised and edited by THOMAS JOHNSTONE, M.D. (Edin.), M.R.C.P. (Lond.), Member of the Medico-Psychological Association of Great Britain and Ireland. Second English edition. Pp. xviii + 352. London: Baillière, Tindall, & Cox. 10s. 6d. net.

SEEING that of late years greater attention has been paid to mental diseases of all natures, a new edition of this valuable work will be received with pleasure, although the changes in it are not of a very striking character. Two new lectures have been added, and more appropriate examples illustrating the lectures have, in some cases, been given. The lectures are eminently practical, and should prove of interest and service to the general practitioner, who naturally has the first trouble and anxiety with acute mental ailments. A study of these lectures should enable him to be prepared to readily deal with emergencies as they come before him.

The Diagnostics of Internal Medicine. By GLENTWORTH REEVE BUTLER, Sc.D., M.D., Chief of the Second Medical Division, Methodist Episcopal Hospital, &c., New York. Pp. 1168. London: Sidney Appleton.

WE welcome the second revised edition of this excellent clinical treatise upon the recognised principles of medical diagnosis. As in the first edition, the present volume consists of two portions, part one dealing with symptoms and their indications, *i.e.*, the evidence of disease; part two consisting of a study of diseases and their characteristics, *i.e.*, diagnosis, both direct and differential. Much care has evidently been expended in revising the present edition, and bringing it up to date; new material has been added, although the volume has only been slightly increased in size. It is a book which may be safely recommended to medical practitioners, especially to those who may be reading for any of the higher examinations. There are five coloured plates, and nearly three hundred illustrations and charts, all of which have been executed with much care. The present edition contains two new sections, one upon Diseases of the Mind, by Dr. William A. White, and the other upon X-Ray diagnosis by Dr. Paul M. Pilcher.

Clinical Diagnosis: the Bacteriological, Chemical, and Microscopical Evidences of Disease. By RUDOLF VON JAKSCH, M.D., edited by ARCHIBALD E. GARROD, M.A., M.D., F.R.C.P., Assistant Physician to St. Bartholomew's Hospital. Pp. 602. London: Charles Griffin & Co., Limited. 24s. net.

THE fifth English edition of this excellent work is very welcome, and, although it is based upon the fifth German edition, is no mere translation, but to all intents and purposes a new edition. Much new matter has been added, as well as some exceedingly good illustrations. Amongst these may be especially mentioned the figures of eosinophile cells in the sputum, and a

coloured plate of trypanosomata from the human blood, derived from a case of sleeping sickness. Dr. A. E. Garrod has revised the translation throughout, and has made many valuable additions to it. We consider that it is one of the best books of its kind, and can with confidence recommend it to all who are interested in the correct diagnosis of disease. As in previous editions, there are some 70 pages towards the end of the present, devoted to bibliography, which enormously increases its value.

Physical Diagnosis. By R. C. Cabot, M.D., Instructor of Medicine in Harvard University. London: Baillière, Tindall & Cox. 15s.

The appearance of a third edition of this work is a fair proof of its well-deserved popularity. It differs from other books of its class in that the author writes more for the practitioner than for the examiner, and has based his work entirely on personal observation. This plan, he admits, has its disadvantages: thus he does not feel qualified to give any description of ophthalmoscopic or laryngoscopic examination. What the book loses in comprehensiveness, however, is more than counterbalanced by a conciseness due to an individual effort. An excellent feature of it is the careful attention which has been devoted to the common methods of diagnosis. The articles on examination of the chest and use of the stethoscope, &c., are admirably written and well illustrated. Descriptions of microscopic and chemical tests are wisely restricted to those actually required by the practitioner, all methods needing the resources of a laboratory are excluded. Alternative procedures are generally omitted; thus in the chapter on examination of the blood—a model of compactness—only one method for staining a blood film, but that the best and easiest, is described.

Therapeutics: its Principles and Practice. By Horatio C. Wood, M.D., LL.D; Professor of Materia Medica and Therapeutics in the University of Pennsylvania. Pp. 907. London and Philadelphia: J. B. Lippincott Company. 18s. net.

For more than thirty years, this has been looked upon as a standard work by the medical profession both in Europe and in America. The present edition before us is the twelfth, which has been completely revised by the two editors of the book, and has been made to conform to the new Pharmacopœia of the United States of America. Some of the chapters have been completely re-written, and a detailed consideration of local anæsthesia, including the so-called spinal and neural anæsthesias, has been added. Most of the recently introduced drugs are fully discussed, thus making the treatise, both for the student and the practitioner, an excellent book of reference.

The Science and Art of Prescribing. By E. H. Colbeck, M.D., F.R.C.P., and Arnold Chaplin, M.D., F.R.C.P. Pp. 198. London: Henry Kimpton. 3s. 6d. net.

The authors are to be congratulated upon the early demand for a second edition of their excellent and practical little book. Some of the sections in the second part of the work have been slightly amplified in this edition, which also contains a useful appendix. In this appendix are to be found set forth the chief ingredients which are contained in the more important of the patent medicines.

Notes by the Way.

Tact in Medical Practice.

MEDICAL students are taught a vast number of things nowadays, but there are some subjects of vital importance to the practitioner in which they receive little or no instruction at the hospital, but are left to pick up for themselves where or how they may. One of these is tact in dealing with patients; another, which is closely allied to this, is consideration for brother practitioners. Of course tact is to a large extent an inborn quality which can be taught only imperfectly, even by experience, to those in whom it is lacking. Many men of good understanding, and possessing all the virtues that adorn humanity, fail owing to hopeless want of tact. Some excellent counsel on the subject was given not long ago by M. Guinard, surgeon to the Hôtel-Dieu, Paris, at the opening of his course of clinical surgery. After insisting on the necessity of gentleness and delicacy in handling patients, he cautioned his hearers against useless curiosity, and especially against asking questions likely to arouse suspicion or anxiety. Thus, a woman, however plain the case may be, should not be asked bluntly if anything has been done to procure abortion; in the first place the answer will certainly be a lie, and then the surgeon is not interested in the abortion as such, but in the psychological condition of the patient. In such circumstances M. Guinard offers the patient a way of escape by simply saying, "You have fallen downstairs, have you not?" A hasty answer in the affirmative tells him all he wants to know. As an example of clumsy questioning he gives the following:—

"Are you a married woman?"

"No."

"Have you any children?"

Here the second question is quite sufficient for the doctor's purpose. In talking of the case in presence of the patient, the greatest care should be taken not to mention words which carry the death knell in their sound. Nowadays the public dabbles so much in medicine that even such technical terms as "epithelioma" and "bacillosis" are likely to be

understood. Everyone knows the difficulty of withholding enlightenment that would lead to family jars from a justly jealous wife. Syphilis, that

> Word of fear
> Unpleasant to a married ear,

may be hidden under a discreet reference to spirochætes, and the gonococcus may still serve as a decent cloak for other poisoned arrows shot by mischievous Cupid. But how long will these parasites retain their mysterious character? On the whole it seems to us to be safer to ring the changes on Gull's saving word "cachexia."

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A Caution as to Anæsthesia.

EVERY practitioner knows how talkative some patients are in certain stages of the process of anæsthetization, and has heard more or less edifying autobiographical details. Of course no attention is paid to such revelations by doctors or nurses, but the situation might be awkward if relatives or friends were present. We remember a man to whom chloroform had been administered several times, and who had somehow become aware that under its influence he babbled—not exactly of green fields. Before resigning himself to the anæsthetic he was always careful to stipulate that his wife should be kept well out of earshot. It is well too that the doctors themselves should not be too talkative before anæsthesia is complete, or when it is passing off. In these stages the patient often hears what is said by those around, and can repeat it when he is fully awake. M. Guinard says he has observed this with particular frequency when chloride of ethyl is used. Like persons in a cataleptic trance the patients seem to be dead to the outer world, but although unable to utter a sound they hear what is said. He cites the case of a young officer for whom he reduced a dislocated shoulder. On recovering consciousness the patient repeated what the surgeon had said to the practitioner who assisted him: "We shan't do it this way; I am going to try circumduction; there is perhaps a fracture of the anatomical neck, etc." It is easy to conceive that fragments of talk at the operation table overheard in this way might be misinterpreted, with awkward consequences.

In Omnibus Caritas.

A WISE man said he had often regretted that he had spoken, never that he had held his tongue. Many consultants could say the same thing, for a thoughtless word may shake the confidence of a patient in his ordinary medical adviser. Doctors have generally a somewhat keen sense of each other's unworthiness, and a doubt may be hinted not merely by words, but by a raising of the eyebrows, a slight laugh, or a shrug of the shoulders. It is well for those disposed to be critical of their neighbours to remember that what Napoleon said of generals is equally true of doctors: that he is the best who makes fewest mistakes. Everyone, therefore, at some time or another requires that his brethren should be to his faults a little blind. The maxim *In omnibus caritas* is a counsel of worldly wisdom as well as a precept of morality.

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Philosophy, Teaching by Examples.

M. GUINARD does not deal so much with breaches of charity as with thoughtlessness. To impress the lesson he quotes a number of examples, and with a fine manly frankness, these are in the nature of confessions. One of them is at once so instructive and so interesting that we may be allowed to quote it at some length. He was treating a wounded man in the country, and the lady of the house one day expressed great displeasure with the local doctor, who had, she said, given the gardener's wife a remedy so strong that in a week she had lost all the hair of her head, her eyebrows, in short, of her whole body. M. Guinard admits that he expressed incredulity, as he knew of no medicament that produced such an effect. The sight of the patient, however, convinced him of the fact. He found that the woman had been ordered pills of acetate of thallium for night sweats. M. Guinard is as uncompromisingly honest as Samuel Johnson, who explained a wrong definition with which he was taxed as "ignorance, pure ignorance"; and he confesses that he did not even know of the existence of acetate of thallium at the time. On returning to Paris he looked up the subject and found that it had been dealt by Combemale, Huchard, and others. Within a week of his first hearing of the drug and its peculiar effect on the hair, a fashionable lady with

luxuriant locks came into his consulting room, and forthwith proceeded to remove her hat, and with it her hair, exposing a glabrous scalp on which there was no trace even of down. Struck by the resemblance of the case to the one he had seen a few days before, he exclaimed: "You have been taking acetate of thallium!" This opened the eyes of the lady, for whom the drug had been prescribed by her own doctor a short time before. M. Guinard penitently leaves to the imagination of his hearers what happened between the fair patient and her doctor as the result of his thoughtless remark. From this story he draws two morals:—The first is that new drugs should not be prescribed simply because they are new; we should wait till their use has been sanctioned by practice. The second is to say as little as possible to patients, who are always ready to grasp at the slightest thing that may give a handle for a charge against their doctor.

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Intellectual Fossilization.

In speaking of the rejuvenating influence of contact with young minds, M. Guinard cites some curious instances of the "fixation of the brain cells" that takes place in men who, having left the hospital, have lost touch with scientific progress. When the X-rays were discovered he heard a great surgeon say: "They will be of no use in surgery; we have long been able to remove foreign bodies imbedded in tissues and to treat fractures without the help of such things." He tells an amusing story of another of the wise men of scientific Gotham. M. Guinard was present at the meeting of the Institute of France, at which Edison presented his phonograph. The instrument began to tell its own story in the characteristic nasal tone: "I am called the phonograph; I was invented by an American ——;" here one of the learned audience slipped softly behind Edison, and quickly put his hands over the mouth and nose of the astonished inventor. It is melancholy to add that the Thomas thus foolishly doubting was Bouillaud, one of the greatest physicians of the last century. His mind had undergone fossilization and become impervious to new ideas.

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The Commercial Spirit in Medicine.

SEVERAL articles on commercialism, professionalism, and their mutual relations, which appeared in the *St. Louis Medical Review*, have been reprinted in pamphlet form, and make interesting reading. The essence of commercialism is, of course, the pursuit of gain. To this end the commercial man may strive honestly, or he may seek to attain his object by ways that are dark, and by tricks that unluckily are not always vain. "This form of commercialism," says the writer, "trades on the probable ignorance of the multitude, and its incapacity from the lack of the special knowledge possessed by the exploiter, to grasp the impossibility of such fulfilment of promises, and shelters itself under the detestable and immoral dogma, *Caveat emptor*. If the other party to the compact tenders spurious coin or false bills as his share of the transaction, he is a criminal for whom no condemnation can be too severe; but if the vendor can palm off some worthless, or comparatively worthless, article for the genuine coin which he demands, he considers himself worthy of commendation as a smart business man. The recent revelations as to the Chicago meat packing trade afford a striking example of commercial "smartness." On the other hand, the true professional spirit is that which leads men to put their duty to their clients first, and the remembrance of their services in the second place. Here we may be allowed to interpose a caution: We must clear our minds of cant, and not pretend to believe that men practise medicine from motives of pure philanthropy. There must be a certain element of commercialism in all professions, for, as the *emigré* nobleman cheerfully said when he was found trundling a wheelbarrow, *Faut vivre*. It is when the doctor's first, if not his sole, thought is for his fees that medicine is degraded into the vilest of trades.

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Commercialism and Quackery.

EVEN honest commercialism is opposed to the spirit that should animate members of a profession. In his remarks on dishonest commercialism, the writer in the *St. Louis Medical Review* has given an excellent description of quackery. More than any

other form of "smart" business, quackery trades on the ignorance of the multitude, and its incapacity from lack of special knowledge to grasp the impossibility of the fulfilment of the promises held out to the customer. The public needs to be protected against dishonest commercialism in the treatment of disease as much as in the food supply.

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"Patent Medicines."

OUR contemporary discusses at considerable length the question, What should be the attitude of the physician towards "patent medicines?" He points out that the term is a misnomer because no patent is ever granted except on detailed publication of full details not only as to the contents but as to the process of manufacture patented. If proprietary medicines were really "patent," that very fact would remove one of the objections to them. There would still, however, remain the fact that these medicines are sold direct to the public without the intervention of the medical man. It is easy of course to read an interested motive into the opposition of the medical profession to self-drugging. But a dishonest commercialism on the part of doctors would rather lead them to encourage the indiscriminate use of "patent" medicines by the laity, as the consequences would certainly be extremely profitable to them. And when, as is mostly the case, the composition of the medicine is not known, no practitioner is justified in prescribing it, and it is the duty of the profession to point out the risks incurred by people who use such preparations either on the advice of the pharmacist whose business it is to sell his wares, or on their own responsibility.

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Competitions.

THE result of the competition for May is as follows:—The best essay was sent in by H. Harold Scott, M.B., Ludlow, Salop; and the best answers to the questions by R. G. Meredith, M.B., Lieut. R.A.M.C., Fort Chambé, Gozo, Malta. Cheques have accordingly been sent to these gentlemen.

Practical Notes.

CREATININE.—Next to urea, creatinine is the most abundant nitrogenous constituent in urine. According to Neubauer, the quantity daily excreted by a healthy adult male is about one gram, whereas that excreted by the female is only about ·75 gram. Creatinine is said to be altogether absent from the urine of sucklings. Some of the creatinine of the urine is directly derived from the creatine of the meat in the food, and most of the meat extracts are rich in creatine. The other origin of the creatinine is the creatine of the muscles of the body which is a product of muscle katabolism. The intimate relationship between creatinine and creatine may be seen from their general composition, creatinine has the formula $C_4H_7N_3O$, and creatine is $C_4H_9N_3O_2$. Creatine and creatinine are of much interest to the chemical physiologist, for urea can be obtained from creatine as one of its decomposition products in the laboratory. An increase in the output of creatinine has been observed in many of the acute diseases during the period of fever, and in diabetes mellitus. A diminution in the output occurs in cases of chronic nephritis, in diabetes insipidus, during the period of convalescence from acute disease, in chlorosis, tuberculosis and in marasmus. Macleod has also observed a marked diminution of the output of creatinine in cases in which the spleen is markedly enlarged, and this decrease is equally conspicuous whether the leucocytes of the blood are above or below the average.

There are two chief tests for creatinine in the urine, viz. :—*Weyl's Test*, which is that to the urine must be added a few drops of a freshly prepared and very dilute solution of sodium nitro-prusside, together with a little caustic potash. If creatinine is present, the fluid will assume a bright red colour, which, on its being warmed, disappears.

Jaffé's Test.—A few drops of a concentrated solution of picric acid and a little caustic potash are added to the urine, the liquid is then heated, when the presence of creatinine is shown by the appearance of a deep red colour. A similar test is used for detecting *acetone* and *dextrose* in the urine. It is evident, therefore, that this creatinine reaction must be kept in mind when testing the urine for sugar, especially if minute quantities only of dextrose are present. In a similar way, both creatinine and excess of urates in the urine are

capable of reducing Fehling's solution to a slight extent, although a distinct red precipitate is seldom produced. These facts show that Fehling's test is, therefore, not absolutely to be relied upon for detecting small quantities of sugar in the urine. When in doubt, therefore, whether sugar is present or not, it is advisable to perform the phenylhydrazin test.

Sulphur Compounds in the Urine.—The chief sulphates in the urine are those of sodium and potassium, and these are mainly derived from the metabolism of the proteids of the body. The sulphates excreted daily vary very considerably in amount, but about two grams are passed in the urine, of these about one-tenth of the total are sulphur compounds in combination with organic radicals, which are known as ethereal sulphates, and originate from the putrefactive processes which occur in the lower part of the intestine. The chief of these ethereal sulphates are indoxyl sulphate of potassium and phenyl sulphate of potassium, the former body is derived from the indole, which is produced in the intestine by the bacterial action which goes on there, and it appears in the urine as *indican*. The formation of these ethereal sulphates is very important, for the aromatic bodies which are formed in the intestine by the putrefactive processes which occur there, are poisonous, but their conversion into the ethereal sulphates renders them comparatively harmless. In cases of carbolic acid poisoning the simple sulphates disappear from the urine and are replaced by combined sulphates, or sulpho-carbolates. There is also found in the urine, but very rarely, another sulphur compound, and that is *cystin* ($C_6H_{12}N_2S_2O_4$). This is apt to occur in the urine of several members of a family, and it has been traced through three successive generations. Investigations by Moreigne and Simon show that cystin is a product of deranged proteid metabolism. Cystin in the urine may form calculi, although cystin may be found as flat, six-sided colourless plates. It is believed that cystin, which is an amino-acid, occurs in the body, combined in the proteid molecule, and that, during the metabolic processes which normally occur, it is converted into taurin and taurocholic acid in the bile, for Wohlgemuth has shown experimentally that feeding rabbits with cystin leads to an increased production of taurine, and partly to the formation of taurocholic acid in the animal's bile.

Cystin Calculi.—These have been met with in infants, and there is a case recorded by Thompson in which a cystin calculus was removed from the bladder of a man, aged 81, who had passed a similar calculus 39 years previously. These calculi are oval and finely crystalline on the surface, and if recently removed from the bladder, of a yellowish colour. If, however, they are exposed to light and oxygen for many months, they gradually assume an emerald-green colour. Cystin calculi are soft and waxy, and cannot, therefore, be crushed with a lithotrite. Cystin calculi burn with a bluish flame and leave practically no residue on combustion. A portion of a cystin calculus may be readily dissolved in ammonia, and, on being allowed to stand, the ammoniacal solution deposits the characteristic hexagonal colourless plates mentioned above. In order to obtain good cystin crystals, it is advisable to use diluted ammonia as a solvent.

The Reaction of the Urine.—Urine is acid in reaction. This is due to the presence of acid sodium phosphate NaH_2PO_4, and not to uric which is usually present, combined with sodium, as a soluble urate. While active digestion and absorption are going on, the urine may for a while become neutral, or even alkaline. This is due to two chief causes, namely, the secretion of free hydrochloric acid by the stomach, and to the water and salts which enter the blood and still further augment the alkalinity of the urine. These salts are for the most part alkaline. By the end of about three hours after food is partaken the urine again becomes more acid. In some cases of chronic cystitis, the urine becomes alkaline. This is mainly due to the presence of micro-organisms, which have gained admission to the bladder either by the urethra, or by contaminated instruments. These micro-organisms cause the urea to decompose into ammonium carbonate, hence the offensive ammoniacal odour of the urine, and in this the phosphates, which are normally held in solution by the acid urine, are now precipitated. For this foul decomposed urine the following mixture has been found useful :—

℞. Urotropinæ - - - gr. vj.
Pulv. Magnesii Boro-Citratis Co. - gr. xx.
Aq. Dest. - - - ad ℥j.
Ft. Mist.

The mixture to be taken three times daily in half a tumbler of aerated water. At the same time acid sodium phosphate may be given internally, about 60 grains of which may be administered in the twenty-four hours.

If the bladder is very irritable, the following mixture will be found very useful :—

R. Sodii Benzoatis	gr. xv.
Tinct. Hyoscyami	♏. xv.
Tinct. Belladonnæ	♏. iij.
Spiritus Chloroformi	♏. x.
Inf. Buchu	ad ℥j.

Ft. Mist.

Two tablespoonfuls to be taken three times daily in some barley water.

In some morbid conditions, such as chronic gout, the urine becomes more acid than it should be, which, in some cases, is no doubt due to the presence of free uric acid. The urine may be so irritating to the urinary passages that it produces irritability of the bladder, with increased frequency of micturition, and, even occasionally, a catarrhal urethritis. In this latter condition the symptoms are much the same as those of gonorrhœa, but, on microscopical examination, no gonococci are found in the urethral discharge, which is also much thinner in character than in gonorrhœa. For this condition potassium salts will be found extremely useful, for they stimulate the renal epithelial cells, which excrete them as alkaline carbonates. Lithium salts closely resemble those of potassium in this respect. These salts, while passing through the renal cells, must of necessity carry a certain amount of water from the capillary plexuses in relation with the urinary tubules, and this will, of course, dilute the irritating urine. The following formula will be found useful :—

R. Potassii Citratis	gr. xx.
Potassii Bicarbonatis	gr. xij.
Tinct. Hyoscyami	♏. xij.
Aq. Chloroform.	ad ℥j.

Misce. Ft. Mist.

Two tablespoonfuls to be taken twice or thrice daily.

Or the following medicine may be tried:—

℞. Lithii Citratis - - - - gr. x.
Potassii Citratis - - - - gr. xv.
Tinct. Belladonnæ - - - - ♏. v.
Syrupi Limonis - - - - ʒss.
Aq. Dest. - - - - ad ʒj.
Misce. Ft. Mist.
Two tablespoonfuls to be taken three times daily.

Case for Commentary in the May Number.—From the details of the case already given, it will be understood that the man, whose age was 45, had, for the last 15 years, suffered from an organic stricture of the urethra. Latterly this stricture had become very much tighter, so that only drops of urine were able to pass along the urethra, and even in order to effect this, the man had to strain considerably. At the same time, it will be noted that some urine was constantly dribbling away to such an extent that his shirt was always wet. Behind the stricture and due to it was chronic cystitis, which increased the irritability of the bladder, and caused frequent micturition at night. This, too, may have been partly due to the fact that the patient had never completely emptied his bladder before going to bed. The sharp pain, which was experienced in the perineum, and which followed straining, was due to a sudden rupture of the dilated and thinned urethra behind the old-standing organic stricture. Urine consequently became extravasated into the perineum in front of the anterior layer of the triangular ligament, and could not trend backwards because of the attachment of this ligament to the deep layer of perineal fascia, nor could it trend laterally because of the attachment of the last-named fascia to the ascending rami of the ischia and the descending rami of the pubes. The urine was, therefore, obliged to go forward into the scrotum, which caused the swelling and throbbing pain already described.

In these circumstances, the treatment to be adopted was the immediate performance of an external urethrotomy, preferably by Wheelhouse's method, and to make further incisions into the skin and connective tissue of the scrotum, perineum, and even the abdominal wall, so as to allow the extravasated and decomposed urine to escape freely.

Novelties and Notices.

KISSINGEN NATURAL MINERAL WATERS.

(E. M. Pick, 110, Tottenham Court Road, London, W.)

Kissingen is in the kingdom of Bavaria, and has a worldwide reputation for the value of its natural waters. These waters contain for their chief constituent, ferriferous chloride of Natrium, and are remarkable for also containing so large an amount of carbonic acid gas as they do. Owing to the exceptionally favourable mixture of their composition, they excel in being able to rapidly and certainly remove the deleterious products which from time to time are formed in the body. Hence they are more than useful in cases of gout, rheumatism, constipation, chronic catarrh, diseases of the respiratory organs, of the nervous system, general plethora, &c. The waters, which should be taken under medical advice, are bottled with the utmost care, and under strict supervision, and from their peculiar chemical and medical qualities cannot be imitated by the modern chemist. The genuine waters are protected by the use of a special label.

SANTYL-KNOLL.

(Messrs. Knoll & Co., 27A, St. Mary-at-Hill, London, E.C.)

This is a tasteless, perfectly non-irritant salicylic ester of pure sandalwood-oil, from which it is derived by eliminating the santalen, and by chemically combining the santal oil with salicylic acid. It thus retains the useful properties of sandalwood oil, while it is free from those which are undesired. Being free from the disagreeable smell and taste of the oil, it can be administered in drops. It does not appear to cause eructations, nor does it irritate the gastro-intestinal tract or the kidneys. It relieves urethral scalding and strangury, lessens the purulent discharge, and clears up the urine. It is eminently suitable, therefore, for the medicinal treatment of gonorrhœa. The dose is 30 drops, three times a day, preferably in milk, or 2 capsules may be administered four times a day.

TABLOIDS.

(Messrs. Burroughs Wellcome and Co., London, Sydney, and Cape Town.)

"*Tabloid*" *Mistura Alba*.—Each of these tabloids contains magnesium sulphate gr. 15 (·972 grm.), magnesium carbonate

$2\frac{1}{2}$ gr. (·162 grm.), oil of peppermint min. $\frac{1}{30}$ (·002 c.c.). They accordingly present a very convenient and trustworthy means of administering this efficient stomachic and carminative combination. They are issued in bottles of 100, and from one to eight may be powdered and administered in water for a dose.

Tabloid "Xaxa" gr. 5 (·324 grm.)—Acetyl-salicylic acid, designated by the trade-mark "Xaxa," possesses all the valuable therapeutic properties of salicylic acid, and its salts without unpleasant after-effects. It is insoluble in the stomach, but readily so in the intestine, and therefore causes no gastric irritation. It may be used in any conditions in which salicylic acid, or sodium salicylate, is usually employed, and is of great service in gout and rheumatism, especially in connection with the ear affections associated with these conditions. It is also of value in some forms of headache and neuralgia, and may be employed generally as an analgesic. The dose is one to three "Tabloids" swallowed with water, two or three times daily after food; but for the relief of pain, 15 grains may be given as a first dose, and two or three additional doses, if necessary, of 10 grains, at intervals of from one hour to an hour and a half. The Tabloids "Xaxa" are issued in bottles of 25 and 100.]

THE ARSENIO-FERRIC WATERS OF LEVICO.

(Messrs. Hertz & Co., 9, Mincing Lane, London, E.C.)

These Arsenic Iron waters have long been held in great repute by the leading members of the medical profession in Vienna, Berlin, and Munich, and are now becoming well known in this country. They are especially useful in (*a*) Blood Diseases, (*b*) Skin Diseases, and (*c*) Nervous Diseases. Instead of sending patients to Levico, medical practitioners in this country can now recommend the use of the waters at home; for both the strong and the mild waters are bottled as they issue from the two springs, without dilution and without undergoing any process whatever. The waters are perfectly clear, colourless, pure, and have an agreeable flavour, which does not render them unfitted for mixing with wine.

COMPETITIONS.

We offer our readers every month two Prizes on the conditions stated below.

A Prize of Two Guineas will be given to the author of the best Essay on a subject to be announced by the Editor.

A Prize of One Guinea will be given to the author who submits the best account of three cases, medical, surgical, or obstetrical, taken from the practitioner's own note-book. The style of the accounts, as well as the medical interest of the cases, will be taken into consideration.

The results of the June Competitions will be announced in the August number.

The Subject of the Essay for July will be

The Nature and Treatment of Spasmodic Bronchial Asthma.

GENERAL CONDITIONS.

A.—All MSS. relating to the Essay must be marked on the top left-hand corner "Essay," and must be sent to the Editor of The Practitioner, 149 Strand, W.C., on or before the 1st day of August, 1906.

B.—All MSS. relating to the cases must be marked on the top left-hand corner "Cases," and must be sent to the Editor on or before the 1st day of August, 1906. The matter submitted must not exceed three hundred words for any one case.

C.—No Essay will be returned unless a special request is made, accompanied by a stamped addressed envelope.

A and B.—(1) One side of the paper only must be written on.

(2) The name or pseudonym, and address of the competitor must be clearly written on each sheet of paper used.

(3) The decision of the Editor is final.

(4) Competitors must be registered General Practitioners.

(5) The attached Coupon must be filled up by each competitor.

THE PRACTITIONER.

AUGUST, 1906.

POSTPARTUM HÆMORRHAGE.

By E. STANMORE BISHOP, F.R.C.S.,

Surgeon to the Ancoats Hospital, Gynæcological Operating Surgeon, Jewish Memorial Hospital.

A CONSENSUS of opinion when backed by recognised authority is a very difficult thing to upset. Still more difficult is it when that opinion has become the recognised teaching with which all students are imbued from their earliest acquaintance with the subject. Teaching which has been handed down from one generation to another is apt to be accepted without question, and teaching, upon which all teachers appear to be agreed, rapidly becomes an article of faith in the minds of the scholars.

Such a subject is that of postpartum hæmorrhage, and such teaching is the doctrine that, in order to check or stop it, the uterus must either be made to contract, or some astringent preparation, such as perchloride of iron, must be applied to its interior. But the last twenty years have seen so many changes in articles of medical and surgical faith that I am not without hope that continued perseverance may effect a radical change in this also. In order to succeed, however, it is evident that persistent and repeated efforts must continue to be made in order to secure it.

The teaching current in the time of Barnes and Playfair, and long before them, is still repeated in its entirety in the latest text-books, and only two months since was once more put forward as the only true faith in a paper which appeared in the *Transactions of the Clinical Society of Manchester*.

I should like to take this opportunity of expressing my admiration for the very complete and lucid manner in which Dr. G. Fitzgerald presented his view, which may indeed be considered the current view of this subject; he thereby rendered more clear and distinct the statements which I call

in question, and familiarised the minds of the profession with the present state of teaching upon this point. By so doing, he has incidentally rendered my task a far easier one.

Those who have been so unfortunate as to meet with a really severe case of postpartum hæmorrhage need no description to remind them of the facts. For those who have not, I think Playfair's description—I take this from one of my opponents, so that I may not be charged with an exaggerated portrait—will bring home to them the fact that perhaps the most critical event in a practitioner's life is associated with that name, and the sudden and unexpected character of the event adds no little to its terrors. This is what he says:—

"There are few sights more appalling to witness than one of the worst cases of postpartum hæmorrhage. The pulse becomes rapidly affected, and may be reduced to a mere thread, or it may become entirely imperceptible. Syncope often comes on, not in itself always an unfavourable occurrence, as it tends to produce thrombosis in the venous sinuses. Or, short of actual syncope, there may be a feeling of intense debility and faintness. Extreme restlessness soon supervenes, the patient throwing herself about the bed, tossing her arms wildly above her head; respiration becomes gasping and sighing, the *besoin de respirer* is acutely felt, and the patient cries out for more air: the skin becomes deadly cold, and covered with profuse perspiration. If the hæmorrhage continue unchecked, we next may have complete loss of vision, jactitation, convulsions, and death." I do not know that I can add anything to this description, but it should be noticed that it is precisely what happens in any other death from bleeding from any other part of the body; that there is nothing peculiar in it, nothing which differentiates it from the results of any other fatal hæmorrhage, nothing which calls for special treatment differing from that which we should almost automatically adopt in any other case.

"Formidable as these symptoms are," he goes on to say, "it is satisfactory to know that recovery often takes place, even when the powers of life are reduced to the lowest ebb. If we can check the hæmorrhage while there is still some power of reaction left, however slight, we may not unreasonably hope for eventual recovery. *The constitution, however, may have received a severe shock, and it may be months, or*

even years, before the patient recovers from the effect of only a few minutes' hæmorrhage.[1] A death-like pallor frequently follows these excessive losses, and the patient often remains blanched and exsanguine for a long time." I do not, myself see the satisfaction to be derived from such a result, especially when one considers that such an exsanguine condition is not necessary, can indeed easily and surely be prevented; but it can only be by a total giving up of the ineffective and indeed absurd methods of treatment even now advised, and an immediate resort to the plain and straightforward measures which in every other case of sudden hæmorrhage have long since been adopted.

It will, I think, be admitted by everyone that anyone who finds himself confronted by a severe case of postpartum hæmorrhage has need of all his coolness; that he needs to have a very clear and distinct idea of the condition present, and, above all, a clear and certain knowledge of the means by which that furious bleeding is to be stopped. Can this be said of anyone who knows only the teaching now given in our medical schools and text-books?

The student is first taught that postpartum hæmorrhage is of four kinds. First, there is primary external atonic hæmorrhage; then primary concealed atonic; then secondary concealed traumatic; and lastly, secondary external traumatic. He has, first of all, to satisfy himself under which head the particular case he has to treat will fall. And whilst he is making up his mind the bleeding is rapidly exhausting the patient.

And consider for a moment what this differentiation means. It involves a search for tears of the cervix, uterus, or vagina in the midst of a torrent of blood, whilst everything is obscured by clots, and as fast as one is wiped away another follows. Only until this exploration has been made can anyone feel certain that the case is not traumatic, and he is a fortunate man who, after a search carried out in such circumstances, can feel sure in his own mind that he has overlooked nothing. And all through this tedious and difficult exploration, the patient's vitality is rapidly becoming less. But even this does not settle the whole question.

Next, the student is taught that there are 14 separate and

[1] The italics are mine.

distinct causes of atonic postpartum hæmorrhage. There is, first, improper treatment of the third stage of labour. During the third stage, as during all the rest, regular rhythmical contractions of the muscular organ, the uterus, have been as regularly succeeded by pauses for rest and recuperation. If, during any of these pauses, he has been so impatient of the delay as to attempt by squeezing or otherwise stimulating the uterus before it was ready to contract once more, he may have done great harm by exciting irregular, spasmodic, and inefficient action. Should the placenta not be extruded so soon as he may think advisable or convenient, he may have introduced his fingers into the vagina, or even into the uterus itself, for the purpose of its removal, and so have imperilled the asepsis of the physiological act. These two manœuvres on his part are much to be reprobated, so say the authorities, and I cordially agree with them, but I ask the reader to note this advice, and to compare it with the advice so strongly insisted upon later, when diminished vitality has greatly increased the risk of both.

But that is only one of the possible causes. There are 13 others, all of which should be duly weighed. They are :—

1. Over-distension of the uterus, due to the presence of twins, hydramnios, &c.
2. Too rapid succession of pregnancies.
3. Constitutional weakness or exhaustion.
4. Inertia of the uterus.
5. Protracted labour.
6. Precipitate labour.
7. Uterine fibroids.
8. Placenta prævia.
9. Adherent placenta.
10. Inversion of the uterus.
11. Partial or irregular contraction.
12. Hour-glass contraction.
13. Hæmophilia.

All these should be present in the practitioner's mind at a sudden emergency like this, since they may all somewhat modify the treatment, and should he forget one of them, and the patient die, that one may turn out to have been the very thing present, and he will, he knows, ever after feel that the death was due to his own forgetfulness.

Is such teaching, I ask again, the best calculated to produce absolute coolness, absolute confidence, quick and resolute action?

Surely, at a time like this, the simpler the issue placed before the mind the better. This is no time for multiplication of details, for ultra refinement of differentiation. Let us see if we cannot reduce this unwieldy mass to its lowest common expression.

We proceed first to eliminate certain factors.

Hæmophilia is a very rare condition. Moreover, it never appears suddenly. No woman becomes suddenly hæmophilic at the end of her confinement. There will have been a history of such a tendency long before, and, in these days of chloride of calcium and adrenalin, the complication can have been prepared for long before the actual confinement. If there is no such history, to suggest the possibility of hæmophilia is only to unsettle and render nervous and uncertain the action of the practitioner.

Inversion of the uterus is not likely to occur unless undue traction has been made upon the cord during the third stage. Even if it has occurred, it makes no difference as to the means to be adopted in order to effectually stop the bleeding. It is to be attended to after the hæmorrhage has ceased, not before.

The same holds good with reference to adherent or retained placenta. To attempt to remove either whilst bleeding is going on is to court disaster. Any interference of this sort is almost certain to be done with unsterilised hands, since the surgeon, who does it with a view to stop the hæmorrhage, cannot wait in face of the furious loss to properly disinfect his hands. The placenta, adherent or otherwise, is itself aseptic so long as it is not meddled with, and its presence makes no difference to the really effective measures which will arrest the bleeding.

All the other causes may be grouped together as meaning either a "tired" uterus, or conditions tending to produce a "tired" uterus. Inertia means nothing else. Fibroids in the uterine wall simply render the force still present less capable of acting to the best advantage. Over-distension, too frequent pregnancies, constitutional weakness, exhaustion and protracted labour all mean that the contractile force

present in any particular uterus at this particular time is but small compared with what we consider normal. Precipitate labour means that too much force has been suddenly exerted by the muscle, and that this will be followed by a correspondingly long period of recuperation, during which no further contraction can be expected. Atony of the uterus means simply that the uterus has but a small stock of contractile force, and that, for the time, that has been expended. The muscle must rest and recuperate before it can act again. All mean that at the end of the third stage, we have a "tired" uterus. If we would oftener use plain Anglo-Saxon words, and were not so fond of sesquipedalian Latin, Greek, or German terms, we should not only carry clearer ideas to those whom we attempt to teach, but we should have clearer conceptions ourselves of our subject.

If, then, we have a "tired" uterus, and one the vitality of which is rapidly becoming less, owing to the loss of blood which is not only depriving its muscular fibres of their force, but draining the nerve centres which control their action, is there any sense in calling upon it without rest, without recuperation, to contract once more? Is that contraction, even if we can evoke it, likely to be effective and persistent? And is it consistent with the teaching *re* the management of the third stage to advise measures which can produce no effect whatever upon the bleeding except by successfully producing contraction? Any such attempt during the third stage, whilst yet the general vitality was unimpaired by loss of blood, is to be reprobated, because it could only produce irregular, ineffective, and spasmodic action. Why should the very contrary advice be given now, when it has become so much less likely to succeed? Has the mere fact that the third stage is over, produced for us a totally new and fresh uterus?

And yet that is precisely the advice given in all text-books.

"The essential point in treatment," says Galabin, "is to secure contraction of the uterus, and by far the greater part of the value of all the means used for the arrest of hæmorrhage consists in their efficacy in producing this effect."

"As there are only two means," says Playfair, "which Nature adopts in the prevention of post-partum hæmorrhage,

so the remedial measures also may be divided into two classes :—1. Those which act by the production of uterine contraction. 2. Those which act by producing thrombosis in the vessels. It is only in the worst cases, where those in the first class have been assiduously tried, *and have failed*, that we resort to those coming under the second heading." "Nature's methods," says Fothergill, "of checking hæmorrhage from the uterus suggest the best artificial means of securing the same object. They are :—1. Retraction of uterus. 2. Contraction of arterial walls. 3. Thrombosis. 4. Pressure. 5. Compression by the bony walls of the pelvis, into which the uterus sinks, and compression of the uterine vessels by the same means." Is it necessary to point out, with reference to the final statement, that compression of the uterine vessels by the bony pelvis is impossible, since there is nothing to compress them against, but the soft, yielding, utterly unresistant walls of the uterine itself. When the uterine is draining itself, or is already drained of blood, its consistence becomes that of wet rag, and it becomes totally incapable of exciting any opposing force.

But Dr. Gordon lays stress upon two forces inherent in the uterine fibre. And he speaks of them as though each was a separate and distinct entity. Contraction is all very well, he says in effect, but the force upon which we should mainly rely is "Retraction." "Of these two forces," he says, "the one upon which we should mainly rely to form a lasting control of hæmorrhage is Retraction. Contraction will undoubtedly control hæmorrhage, but it is followed by relaxation, and with the relaxation, did no other force come into action, there would undoubtedly be hæmorrhage. Contraction is mainly an expulsive force, and does not have retraction dependent upon it. Retraction will go on independently of contraction, if there is nothing in the uterus to hinder its action. It is the force which gathers the walls around and moulds them to whatever is in the uterus. It is not elasticity, but plasticity." One would naturally imagine, on reading this, that this wonderful "retraction" was a separate thing altogether; and that it was of the utmost importance that we should understand what it is, and how to excite and control it. I confess that I was deeply impressed,

and sought all through the rest of his paper for some further information upon this all-important point. But though he refers to it once more in order to still further emphasise its value, he says nothing further about it, but goes on just as all the others do, to repeat the same old ways of exciting *contraction*, and failing that, thrombosis. No mention of any way of exciting retraction, which, it will be noted, has nothing to do with contraction, but the existence of which he apparently altogether, from this time onwards, forgets.

But, as he gives us no further help, it becomes necessary to see what other authors, who also mention and lay stress upon retraction, have to say about it. Fothergill says that "the lessening of the uterine cavity is caused by the retraction of the uterine muscle. After each contraction there is relaxation, but this is not complete, and each muscle-fibre, after the temporary shortening and thickening of contraction is over, retains a certain degree of shortening and thickening called retraction." Quite a different idea! Retraction, according to this writer, is not a separate thing from contraction, but only a part of it which remains permanent. Galabin, in a footnote, says that "Retraction means the contraction and shortening of the uterine muscle, not followed by relaxation." Jardine agrees with him, and I suppose we may take it that this is the real and true meaning of "Retraction."

Every one has seen the ebb and flow of the tide. If the tide is coming in, each succeeding wave carries the limit of the water a little further. Every inrush is succeeded by an ebb, but this ebb does not carry the water quite back to the place from which it started. Numberless succeeding waves all add a little to the ground gained by the tide; but it would be absurd to consider both things as separate entities, separate and distinct forces. They are both due to the action of the tide; if this were stopped, both results would disappear. Just so, if by any cause, such as the loss of vitality produced by loss of blood, the power of contraction of the uterine muscular fibre is weakened or lost, by just so much is the power of retraction weakened or lost along with it. Retraction is a result of contraction, a part of the same force, not a separate and distinct one. How much more simple the whole business becomes with this explanation!

And it is well to remember that, at a critical time like the one we are discussing, simple, clear ideas are of the first importance, if one is to keep a clear head in regard to action.

Hence it is evident that we can dismiss this notion of retraction as a separate mysterious force, and bend our whole energies towards securing contraction, if that is indeed the thing for which you have to aim. But is it? All text-book writers agree in saying that it is. I unhesitatingly deny it.

Throughout I have tried to show that, if we have to rely upon contraction of the uterus to stop the bleeding from it, the chances of our obtaining such contraction are poor from the start, and are becoming poorer with every minute that the bleeding persists. Why did the bleeding start in the first instance? Because the uterus was tired and required recuperation. Relaxation came on before the mouths of the open arteries and veins were closed, and those vessels being open, and the position of the body favourable, blood pours out of them, and rapidly drains the body, depriving the vascular system of its normal content; the uterus, along with other muscles of its power of contractility; the nerve centres, and amongst them those which control the uterine contractions, of their force, and of even greater importance, the higher nerve centres of respiration and cardiac action of their vitality. If the uterus did not succeed in contraction at first, when all these important centres were fairly vivified, how can we hope that it will succeed later when they are all drained, and with each succeeding minute are becoming still poorer powers of force? The truth is exactly the reverse. *We must not look to contraction of the uterus to stop the hæmorrhage, but to the cessation of the hæmorrhage, in order once more to permit of contraction of the uterus.*

Of course, if this is admitted, it is needless to go seriatim over the measures advised in order to bring about this all desired uterine contraction. But I should like to point out two things which appear to have escaped the notice of previous writers on this subject.

There are six various ways in which we are to try to bring this about. Do the advisers of these various measures believe in any one of them? No! We are to *try* them all, one after the other, and not to try any one for any length of time.

Dakin says, "In following this treatment, the various manœuvres must succeed one another rapidly, and the preparations for those to follow must be made whilst any one method is being employed." Playfair says "the prolonged use of all these remedies . . . if they fail to excite contraction rapidly, will certainly prove injurious." Moreover, almost every one uses the phrase after advising the use of one measure. *If this fails.* . . . They expect them to fail. They know that they will fail in any really severe case. The main use of having tried them appears to me that the practitioner may have wherewith to answer the coroner at the ensuing inquest, that he may be able to kiss the book and swear that every means known to science has been faithfully employed.

The next point is that most important one—that such advice does not conduce to the confidence of the practitioner at this critical time in the weapons placed in his hands. It cannot, I think, be too often insisted upon that, at such a crisis as this, the man upon whom all the responsibility rests should have all the coolness which is only to be gained by perfect confidence. What confidence, what coolness can he have when he is told by one of his teachers, "supposing these means fail, and the uterus obstinately refuses to contract, in spite of all our efforts, and do what we may, cases of the kind will occur."[1] . . . He is far more likely to give up the unequal struggle, and yield to his patient's exhausted pleading to be let alone, to be allowed to die quietly.

But another alternative is placed before the already overburdened practitioner, overburdened by anxiety, overburdened by a multiplicity of advice. "If all these measures fail to excite contraction of the uterus," he is to attempt to produce local thrombosis by astringent injections into its cavity. Note, that he is nowhere told how he may know when he has tried these plans sufficiently, although it is at one and the same time impressed upon him that he must not attempt the second plan until he is certain that the first cannot succeed, and that undue prolongation of his trial will "certainly prove injurious." Could any better method be devised for reducing a man to a state of miserable uncertainty? And by this time the sands of his patient's life are very near the end. Surely at last,

[1] Playfair, Vol. II., p. 130.

something is forthcoming on which he can rely absolutely, though, if so, one wonders why it was not brought forward first of all, and thus all this misery to himself and his patient might have been saved.

But the alternative plan also is doubtful. It is to be tried on the chance that it *may* succeed. And it too is injurious, not to say very dangerous.

Cases are on record of sudden death from embolism having been caused by it. Even if by great good luck it has succeeded in checking the hæmorrhage, it will be followed inevitably by great risk of sepsis. It consists of injecting a solution of perchloride of iron, the clots formed by which are so tough and adherent that they can only be dislodged by suppuration. So, if your house is on fire, you are first to drown it, and if that fails, blow it up. Some of the ruins may be left.

One other alternative is offered by Dr. Gordon Fitzgerald. I confess that I cannot imagine that he is serious in suggesting it. It seems to me that he was anxious to render his paper so complete as to leave no one a chance of suggesting that he had omitted anything, and so he added this without thinking of what was really meant by it. He advises, as the very last resource, removal of the uterus. Does he seriously suggest that he, with all his skill, would deliberately attempt such an operation on an exsanguinated patient at the last ebb of life? If one did not know that he is a clever operator, one would be inclined to ask if he had ever performed the operation, and if he knew what it involved. No, he has not stopped to think. It has occurred to him that it would round off and make absolutely complete his list of remedies—otherwise . .

But it is worth while to look for the underlying idea of such a suggestion. Why should one think of removing the uterus in order to stop hæmorrhage from it? Why? But to gain control of the vessels supplying that organ. Is this then the only way to effect that purpose? Certainly not!

The vessels which supply the uterus are well known. However multitudinous may be the open mouths in that organ, they are but the extremities of two sets of vessels, the uterine and ovarian. There are but two different kinds of blood vessels, the arteries and veins. The flow from the veins is easily and rapidly controlled simply by altering the

relative position of these open mouths and the heart. What is the first lesson in ambulance work with regard to venous bleeding? Is it not to elevate the limb in which the bleeding vein is situated? And do not we all know that any bleeding veins will at once cease to bleed if this is done? Elevate the pelvis, then, so that the uterine and ovarian venous mouths shall be higher than the heart, and you need no longer fear hæmorrhage from those venous sinuses. This can at once and readily be done by pushing a table beneath the bedfoot, or elevating the lower parts of the bed upon two stout chairs. But this elevation must be purposeful and definite. It is worse than useless merely to elevate the bedfoot a few inches. You have now merely to cope with the arteries.

And the arterial supply of the uterus is very simple. However many open arteries may be spurting—they all come from four main vessels, the two ovarian and the two uterine. Of these the two most important are the two uterine, these are branches of the two internal iliac arteries, these of the two common iliacs, and these, in their turn, arise from one common stem, the abdominal aorta. Compress this and no more blood can issue from any of the many mouths of the uterine arteries, which are all supplied by it. By this compression the tap is turned off.

Can this be done? There is nothing easier. The aorta itself is held forward in the abdominal cavity by the spinal column upon which it rests, and which supplies a firm backing against which compression may readily be made. The spine comes much further forward than would be imagined by any one who has not studied a vertical section of the body with a view to this point. In emaciated women it may lie directly beneath the anterior abdominal wall. In all, the structures in front of it, the intestines, may readily be displaced. The available length of the aorta varies from 3 to 5 inches, so that pressure need not be concentrated for long upon any one point, but may be shifted upwards and downwards as may be necessary without at any moment losing control of its contents.

And the tissues over it, with which we have to deal, are, at a time like this, extremely supple and unresisting. The muscular wall itself, which ordinarily interposes a firm resistance to pressure, has been steadily stretched and weakened for

months by a firm, steadily-increasing mass within. That mass has been somewhat suddenly withdrawn, and the muscles have not had time to regain their former tension. Moreover, they partake, with the relaxed uterus, in the lessened vitality consequent upon the first loss of blood. They offer little or no resistance to the firm pressure brought to bear through them. By the very condition of the case the uterus beneath, even if it lies so high as to be between the hand outside and the aorta, and contains blood, is relaxed and unresisting. It is as easily compressed as wet washleather, which, indeed, it somewhat resembles. Any blood in it is easily displaced, and the hand comes down easily on the aorta, which, at first, is felt feebly beating against the restraining force, in a very short time, however, increasing in volume and urgency of pulsation as the heart becomes once more full with the blood which, no longer lost, arrives from all the veins of the lower extremities, from which it can well be spared for a time.

But the restraining force should not be a hard, unyielding pad of non-sentient material, for two very cogent reasons. First, because the pressure exerted by such a pad, if it is to be effectual, may do great harm by indiscriminatingly bruising the sympathetic system of nerves surrounding the vessel, and, secondly, because it will give the operator no indication as to when he may commence to reduce his pressure, and permit a small, but gradually increasing flow to return to the arteries. The ulnar surface of the operator's own clenched fist is the best, as it is the readiest instrument to use. With it he can gauge his pressure accurately. Against it the gradually increasing force of the aortic pulsation is felt to beat. He can shift its position upwards or downwards as may appear desirable, always controlling the aortic contents, yet never maintaining any one position long enough to produce any undesirable effects.

Whilst one hand is so employed, he can use the other to detect any returning contraction in the uterus, and to take advantage of it by assisting the uterus to once more, and definitely, empty itself of contained clots, but there should be no hurry about this. The uterus should show unmistakable signs of returning vitality, before any attempt at assistance is made, otherwise the same mistake will be made, which is so strongly and rightly reprobated in the management of the

third stage. Only irregular, spasmodic and inefficient contractions will follow any undue haste in attempting to bring them about, but when once the uterus is unmistakably contracting, massage of the uterus becomes justifiable, and only then, and not until then, does it become so.

Should one hand become tired, the other can easily and quickly be substituted—the second being placed above or below, before the first is removed. Should both of the surgeon's hands be tired, or should he need to use them for any other purpose, it is easy to teach the nurse the position in which to place her hand and the direction in which she should press in order to relieve him for a while. Thus freed, it is easy for him now to discover and to repair any tear in the utero-vaginal tract, unimpeded by the furious bleeding which is now absent, but which, whilst unrestrained, obscured everything and rendered all his observations uncertain. Adherent placenta may now safely be separated and removed, but it is well to follow implicitly the directions given in the third stage of labour, and to wait with patience for the natural expulsion of a placenta which is merely retained. Acting now with coolness, and not driven by the urgent idea of doing all this to stop the hæmorrhage, he will carefully sterilise his hands before doing anything which involves the touching of any internal and possibly raw surface. These things should only be attempted, as they can only satisfactorily be done, *after* the hæmorrhage has been controlled.

And now, the value of the fact, so often put forward as an objection to this plan, that by no means can we also stop the current in the ovarian arteries, becomes evident. It is, so far from being an objection, a fact of the greatest importance, of the very greatest assistance in securing a successful result. Could we entirely deprive the uterus of all circulation, its condition would rapidly become that of an Esmarched limb, and its chances of return to a normal condition almost nil. But whilst by compression of the aorta and the raised pelvic position, we stop all possibility of dangerous flooding, the ovarian arteries still keep up sufficient supply of blood to the uterus to permit of its recovery. These arteries are so long, so tortuous, and so narrow, that in this position, and with the weakened cardiac force present in these cases, no dangerous

amount of blood can be lost through them, but sufficient still reaches the uterus to form clots in the open mouths upon which the arteries can contract when once they recover; to vivify the muscular wall, whilst the bulk of the circulation maintained in the upper part of the body has revivified the nerve centres which govern those muscles, whilst at the same time it has kept in good condition those more important nerve centres, those of respiration and cardiac action.

In consequence of this continued but very decreased circulation, the uterus is kept alive, and can revive, and, all danger of flooding over, can profit by the rest and recuperation it requires and can now obtain, and all this is not mere theory. It is the soundest practice, and is in conformity with that known and accepted now for many years in cases of hæmorrhage from bleeding vessels in all other parts of the body. The one sole difference here is that the vessels in question cannot be ligatured by the surgeon. The ligatures for these vessels are the muscular fibres around them. They cannot act for the time. If we can wait, however, they can and will, as soon as they have recovered. Until that time arrives, we have got to keep the blood within the body by other means. Suppose that a surgeon is called suddenly to a man whose thigh has been removed by a circular saw. He has no appliances with him. Would he squirt hot water at the stump whilst he sent for artery forceps and ligatures? Would he try compression of the surface of the wound with gauze? Would he paint the bleeding area with perchloride of iron? Anyone who acted in this matter would proclaim himself at once for what he was—a man absolutely ignorant of all surgical progress for the last two centuries. No! no one could be found who would act in such a manner. He would at once elevate the limb, and compress the main artery, and then, the bleeding being checked, wait with what patience he might until his artery forceps and ligatures arrived. And he would be in far worse plight than a practitioner who has a bleeding uterus, unless he, too, compressed the abdominal aorta—for compression of the femoral might have no effect on the profunda or sciatic arteries. We too have to wait for our ligatures, and must proceed in precisely the same way.

It is often asked, for how long should such compression

be kept up? The question itself reflects the mental attitude which has been produced by previous teaching. No one measure is absolutely to be trusted. It is only to be tried for a short space of time, and then, no matter what the result, some other must be substituted. But if this plan is honestly adopted, and not merely perfunctorily "tried," as only another of the already long list of untrustworthy remedies, it will be found to act, and personal experience of the certainty of its result may so far modify this mental attitude as to render the question superfluous. Meanwhile, one would answer that it should be used so long as may be necessary until our ligatures arrive, or in other words until the uterus recuperates sufficiently to close the open vessels by its own contraction. Would a surgeon release his tourniquet or his grip of the main vessel before the arteries were tied? Perhaps also, it may add to the comfort of hesitating, half-convinced practitioners to say that I have never yet found it necessary to compress longer than for three hours, and that the great majority of cases are safe within an hour.

But it will be recognised that it is obviously misleading to call this method simply "compression of the aorta." That is only half the proceeding. The other, and perhaps even the more important half, consists in the elevation of the pelvis. Since not only does such elevation stop the venous flow, but it decreases the force of the arterial jets. Both together, however, supply a rational and trustworthy means of control.

The compressing force, as has already been said, should be gradually and tentatively removed, the effect being carefully watched. It should be at once replaced and maintained, should the bleeding recur. The elevation of the pelvis should be persisted in for at least 12 hours, longer if the amount lost has been great. It also should be only very gradually restored to the normal level.

In this way, and in this way only, I believe, should post-partum hæmorrhage be treated. The result will do more than anything else to restore to the man, who has to face all the terrors so graphically described by Playfair, that coolness and that confidence which he so much needs, and which can only result from absolute certainty that the weapon which he uses will not fail him when he most requires it.

SEVEN CASES OF HERNIA TREATED BY THE IMPLANTATION OF A PREPARED FILIGREE OF SILVER WIRE.

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It is now two years and a half since I introduced into this country the method devised by Dr. Willard Bartlett, of St. Louis, for the radical treatment of deficiencies of the abdominal wall. Since that time I have employed the method in seven cases, inclusive of that which I showed six months after operation before the Clinical Society of London in 1903.[1] Of these cases, one was done for post-operative ventral hernia, one for extensive separation of the Recti muscles and enteroptosis, one for umbilical hernia, and four for inguinal hernia ; of the latter, two were in males and two in females.

That a larger number of cases has not been submitted to operation is due to the fact that, although I have been strongly impressed by the practical utility of the operation, I am not of the opinion that it is advisable to elevate it to the dignity of routine treatment, and to employ it in all cases of hernia. There are many admirable methods of repairing the various hernial apertures of the body, and these, in properly chosen cases, give very satisfactory results ; but there remain certain cases, especially of umbilical, ventral, and scrotal hernia, in which it is quite impossible for such methods to succeed ; and in these one is obliged to resort, if the hernia is reducible, to some hypertrophied variety of the primeval truss with all its discomforts, uncleanliness, and perennial repairs, or, if it is irreducible, which is most commonly the case, to a policy of masterly inaction, or to the employment of some operative method which goes beyond the mere fibroplastic aims of the modern "radical cure." Such a method is to be found in the use of the prepared filigree of silver wire ; and here I would like to point out that the filigree devised by Bartlett has no resemblance, in appearance, weight, action, or any other point,

[1] *Clin. Soc. Trans.*, 1904.

except in its ultimate purpose, to the various forms of gridiron and perforated metal plate, which have of recent years been "weighed in the balance and found wanting."

At the time of exhibition of my first case, doubts were freely expressed as to the possibility of inducing the tissues to retain so large an amount of a foreign substance as was utilised, as a permanent part of themselves. The possibility of suppuration occurring was suggested as a bar to the method, and it was thought that, in such an untoward event, it would be necessary to remove the filigree. The probable discomfort of the appliance to the patient was mentioned as an objection, in cases in which good fortune might permit of its being retained *in situ* after a primary union.

I am prepared to admit that I was rather sceptical as to the possibility of obtaining the good results I desired. The hope of permanently curing such cases as seemed perfectly hopeless in the light of the ordinary methods of operative surgery, however, led me to adopt that of filigree implantation, and I propose to set forth my results, so far as they go, as an inducement to others to accord a trial to a method which seems to promise much to patients and surgeons alike.

Case 1.—The first case is that of a woman of 45 years of age, who, as the result of the breaking down of a laparotomy wound, had suffered for a period of fifteen years from a large ventral hernia. The tumour, which was almost completely irreducible, and of about the size of a child's head, was pendulous and tender, and, in the erect position, covered the pubes entirely. The sac was felt to contain masses of fibroid and adherent omentum, and some coils of bowel; and at its neck had a diameter of about 4 inches. The patient, who was otherwise a perfectly healthy woman, said that she had been practically bedridden for fifteen years owing to the pain and nausea induced by any attempt to work, and the inability to wear a truss since the mass had become irreducible. The case seemed to promise so little, if treated by the ordinary method of radical operation, that I resolved to attempt its cure by the operation, at that time recently detailed,[1] of filigree implantation.

This operation I accordingly performed in October 1903.

[1] Dr. Willard Bartlett: *Annals of Surgery*, July 1903.

The Recti muscles were found to be separated to the extent of about 4 inches; when freed, however, they could be brought, by the exercise of considerable tension, to within an inch of each other. The filigree employed measured 5 inches by $2\frac{1}{2}$, and was formed of No. 27 silver wire arranged in twenty loops on either side. The sac was emptied in the usual manner, the excess of peritoneum cut away, and the filigree laid upon the peritoneum deep to the posterior sheath of the rectus muscle above, and in contact with the muscle itself in the lower two-thirds. One or two fine catgut sutures were placed round the central strand of the filigree, and through the peritoneum in order to prevent any shifting, and the muscles were, so far as possible, drawn together over the edges of the loops. The wound was then closed without drainage, healing took place by primary union, and the patient left the hospital within a month.

I have quite recently seen this patient, who tells me that she has never worn a belt or binder of any kind, and has regularly done her household work since the time of her operation. Her abdomen is flat and firm; she has never experienced any inconvenience from the presence of the filigree, and is in all respects in perfect health.

Case 2.—A woman of 30, who for the last ten or twelve years had suffered from extreme separation of the recti muscles and marked enteroptosis, which she ascribed to repeated pregnancies, came under my care at the Hospital for Women in July 1905. She was a short, stout woman, in good health, but almost incapacitated by the dragging and nausea produced by her condition. On standing up, the abdomen, which was very lax, bulged forwards in the middle line, and the entire hand could be easily passed between the muscles, the skin of the abdomen being invaginated before it into the abdominal cavity. The separation amounted to over 4 inches at the umbilicus, and to about $2\frac{3}{4}$ at a point midway between this and the ensiform cartilage.

The condition was so extensive, and the muscles so feeble, that I suggested the use of a filigree; the operation was carried out with some difficulty, owing to the length of the wound and the constant tendency to proptosis of the intestines, in July 1905. The filigree employed for this case

measured 9 inches by 4 inches, and had fifty loops on either side.

Following the same steps as in the previous case, I found the greatest difficulty in stripping the peritoneum from the expanded and adherent sheath of the Rectus muscle; the membrane tore repeatedly, and the haemorrhage from the surfaces of the aponeurotic structures was very troublesome. Eventually, however, sufficient space was obtained in which to embed the filigree, and the muscles and the posterior layer of the sheath of either side were then approximated as closely as possible, after which the wound was closed with the exception of a small space at the lower end, into which a gauze drain was introduced.

There was much oozing in this case, and, owing chiefly to this, and to the obesity of the patient, who was moreover not in the best of health, the resulting blood-clot broke down. The discharge was very free for some days, and I feared that I might after all be compelled to remove the filigree; but by means of repeated flushing with peroxide of hydrogen solution, which in its turn was washed out with a 50 per cent. solution of rectified spirit, the wound was reduced, at the end of six weeks, to a mere sinus, and soon healed completely.

This patient, like the last, is at the present time in the best of health. She has never worn any sort of belt, and her hernia is apparently completely cured, the abdominal cicatrix being very firm and resistant, and showing no sign of bulging on coughing or straining. The filigree, in spite of its size (being, I believe, the largest yet recorded), causes her no inconvenience whatever.

Case 3.—The hernia in this case, that of a woman of 63 years of age, was of the usual umbilical type, but very extensive, and having many out-lying saccular dilatations, and being complicated by wide separation of the Recti muscles. The patient was extremely obese, and had suffered from the hernia for a long period of years. At times symptoms of incarceration had been present, and as, owing to chronic pain, no truss could be worn, the mass of omentum in the sac was gradually increasing. Operation was advised, and was carried out in July 1905, the filigree measuring 6½ inches by 3 inches, and having about 40 loops on either side.

Taught by the experience gained in the last case, I departed slightly from Bartlett's method on this occasion. Having split the sheath of the Rectus muscle on either side, I easily separated the posterior layer from the muscle by passing the fingers between these structures on either side. This resulted in practically no hæmorrhage, and thus subsequent oozing was avoided. After excision of the sac, the peritoneum and posterior layer of the sheath were brought together, and upon the latter I laid the filigree, fixing it with a few light sutures. The muscles were then drawn as closely together over it as possible, and the wound, which was closed without drainage, healed by first intention. This patient came to see me this month (April), wearing no belt, and said she had experienced no discomfort whatever since the operation, and that she had been able to carry on her work in her house as she had not been able to do for many years. The abdominal condition was excellent, no bulging being seen in any position, and the resistance of the hernial site being perfect.

Case 4.—The first of my inguinal cases occurred in a nun. She was 40 years of age, and had suffered, since she was 30, from an inguinal hernia which, although of the oblique variety, had become so large from the pressure of an inefficient truss (the inguinal structures being thinned out and atrophic), that it had all the usual characters of a direct hernia, and readily admitted the passage of three fingers.

Such a hernia promised little in the way of cure by any ordinary method, and I therefore employed a filigree measuring 3 inches by 1½ inches, and placed it upon the peritoneum after excision of the sac. The operation was completed in the usual way, the filigree being buried beneath the conjoined tendon; no drain was used. The patient, whose duties involve the carrying of heavy weights daily, has now been actively employed during the last 6 months without the assistance of any truss or belt. The site of hernia is strong and firm, and she has suffered no inconvenience from the presence of the filigree.

Case 5.—This case is the only one of the series which has not been quite successful, but the want of success is in no way due to the method employed, but to the faulty carrying out of the after treatment.

The patient, a seaman of 61 years of age, came under my care in October 1903, having suffered for many years from an enormous scrotal hernia, for which he had long worn a most inefficient truss. The usual result of this was present, in the pigmented tissue-paper skin and atrophied subcutaneous tissues covering an expanded canal, and a sac thickened by congestion. Half the hand could be easily passed into the abdomen, and the hernia was partially reducible. A filigree, similar in size to the last, was used. The separation of the sac from the cord and of the peritoneum from the conjoined tendon, resulted, as in Case 2, in obstinate oozing, and, therefore, a gauze drain was employed at the iliac end of the incision. This should have been removed at the end of twenty-four hours, a temporary suture being left, by which to close the wound on its extraction. Unfortunately, owing to a lapse of memory on the part of the House Surgeon, this drain was allowed to remain *in situ* for over five days, with the result that, although no actual suppuration occurred, a sinus formed, which refused to close. It is still open, in spite of all attempts to cure it, although it only admits a fine probe for the depth of an inch, and there is practically no discharge. I should, I think, have removed this filigree some time ago, were it not that the patient obstinately refuses to part with it, saying that "he is delighted with the result, and prefers to keep the sinus rather than risk the return of the hernia." There is nothing to indicate such return at present, for the scar is as firm as I could wish it to be, and, with the exception of a small pad of lint upon the sinus, the patient wears nothing to support the part.[1]

Case 6.—The hernia in this patient, a woman of 63, was of the direct variety, and bulged forwards around the pad of the truss she was in the habit of wearing. It had been present for five or more years, and when fully down, filled up the inguinal region, forming an ill-defined and lobulated swelling, which was only partially reducible. She complained of constant dragging pain in the loins and back, which rendered her quite unfit to do her household work. Operation was performed in November, 1905.

[1] Since the above was written, this sinus has closed spontaneously although the patient has not been confined to bed. The scar is sound, and he has returned to his work.

The filigree which I used in this case was rather less in width, but of the same length as the last, and was introduced in exactly the same way; the absence of the spermatic cord rendering the implantation very much simpler than in a male case. The tissue of the conjoined tendon and that of the aponeurosis proved to be so attenuated and adherent as to be almost unrecognisable, and would have been perfectly useless in the case of the ordinary operation. No drain was used, and an uneventful recovery ensued. Recently her husband has written to say she is in excellent health, and that she is doing all her work without the aid of any truss; she feels nothing of the filigree.

Case 7.—A young seaman, 17½ years of age, was admitted to the Dreadnought Hospital under my care in December, 1905, for bilateral inguinal hernia. The rupture on the right side had already been operated upon abroad, and, as the result apparently of failure of primary union, had recurred, leaving a wide gap in the site of the inguinal canal which admitted the passage of three or four fingers directly backwards into the abdomen. He was wearing a truss, which, although well made, was quite ineffectual in retaining the hernia, which came past it at once on any extra strain being thrown upon it. In view of the nature of his work, his age, and the size of the gap, I thought it useless to submit him to the usual operation, and he agreed to the use of a filigree. This I made of a pattern rather different from the previous cases, in which I had experienced some difficulty in fitting the pubic end of the filigree in place, by giving it half the width (three-quarters of an inch) at the pubic end that I allowed for the iliac. It was thus trapezoid in shape and three inches in length. At the operation it was found that it would be impossible to accommodate this length of filigree between the internal ring and the pubic spine, and as the hernia involved the tissues external to the ring, I divided the filigree transversely, and placed one half deep to the cord and upon the peritoneum, and the other deep to the internal oblique muscle in its outer half, and superficial to the cord in its inner half. The cord thus came to lie, for the first inch of its course, between the two halves of the filigree. The wound closed by first intention, and the patient left hospital within six weeks. A skiagram showed that the filigree

was in good position, and on examining the scar three months later, during which the patient had worn no truss or bandage, it was found to be firm, resistant, and devoid of impulse or bulging on the severest straining. No inconvenience has ever been present since the operation. The rupture on the left side was of different degree entirely, and was treated by Bassini's method.

I am of course aware that these cases are few in number, and that some of them are recent, but they serve in all respects to confirm the results of Dr. Willard Bartlett, who also published seven cases, the periods in these corresponding closely to those of my own. The results obtained are, I think, such as to justify the belief that in the implantation of prepared filigrees of silver wire is to be found a method which at last bids fair to justify the hitherto misleading term "radical cure," as applied to hernial operations. From the experience of the operation, derived from the foregoing cases, I have been tempted to draw certain conclusions which may not be out of place here.

(1) *As regards the Size of the Filigree.*—If possible, the length should be at least half as long again as the hernial opening, whether this is median or inguinal. If umbilical, or median ventral, the width should be about two thirds that of the gap between the unapproximated Recti muscles; for these, when well freed from their sheaths, will be found, even when moderately attenuated, to come well over the margins of such filigree although they will not actually meet. In the case of inguinal hernia, a width of half an inch to an inch at the pubic end, and one and a half to three at the iliac end will generally be found sufficient. Should it be found, at the time of operation, that the filigree is too wide at any point, the difficulty can easily be overcome by simply bending back the points of the loops towards the central strand, at the point at which it is desired to reduce the width.

(2) *The correct Situation of the Filigree.*—Dr. Bartlett, in his paper,[1] advised that the filigree should be placed upon the peritoneum in order to make the posterior surface of the anterior abdominal wall perfectly flush. This, although theoretically the ideal site, is, as I have shown in the reports of my

[1] *Op. sup. cit.*

second and third cases, not always practicable in old standing herniæ, in which firm adhesion has occurred between the peritoneum and the posterior sheath of the Rectus muscle, the amount of tearing of vessels which results from the stripping apart of these two structures is incompatible with a clean, dry wound. I have, therefore, found it much simpler and equally effective to implant the filigree between the Rectus muscle and the posterior layer of its sheath. The only hindrance to this will be found in the presence of the Lineæ transversæ, which are at times firmly attached to this layer. These, however, are easily divided with scissors, and will be found to give rise to little hæmorrhage. This situation has the further advantage that the cavity thus formed is not nearly so liable to be distended with blood as that which has the flaccid peritoneum for its posterior wall; and the filigree can be much more firmly moored to the rectus sheath than to the peritoneum.

(3) *The most suitable Spacing of the Loops.*—The correct number of loops to the inch in a filigree must always depend to some extent on its size and gauge. It is obvious that, in very large and long filigrees, the gauge must be somewhat stouter, and therefore the loops rather wider apart, than in small ones; but I believe that greater efficiency is obtained by placing the loops as closely together as may be consistent with perfect pliability. As a general rule, I allow six loops to the inch in filigrees for umbilical and ventral hernia, and eight to the inch for inguinal, using wire of nearly double the gauge for the former that I employ for the latter.

(4) *The Question of Removal of a Filigree.*—The impression that suppuration must necessarily compel the removal of a filigree is, I believe, quite erroneous. This belief may possibly at times apply, in certain cases of *inguinal* hernia, where the blood-supply has been much interfered with; but even here it is unwise to be too hasty in assuming what has still to be proved. Rest, irrigation, and the swabbing out of a sinus with pure carbolic may do much; a fact which is well borne out by my second case, in which the suppuration was really extensive. It has been suggested to me that, if removal was decided upon, it might prove a very difficult matter, owing to the incorporation of the filigree in the tissues. This is quite

possible, but, as I have not yet been faced with the necessity, I am unable to make a positive statement. I should be inclined to think, however, that the removal of the *entire* filigree would rarely be necessary, and that only that portion, which is actually lying loose in or under the sinus, should be removed.

(5) *The Filigree as a Time-saver.*—In the saving of time, an extremely important matter where obesity and chronic bronchitis are concerned, there can be no possible question as to the utility of the prepared filigree as compared with the method of attempting to weave in a network of silver wire at the time of operation. It is impossible that such attempts, even in the most skilled hands, can ever result in the production of a structure in any way approacing to the perfect symmetry of a prepared filigree; and the correct spacing of the loops, and the repeated passing of the needle through muscular tissue, are bound to end in enormous loss of time and the production of troublesome oozing, to say nothing of the needless fingering of the part and the creation of irregular tension between the Recti muscles. All this means a protracted anæsthesia in patients who are frequently little suited to such treatment. Even where local anæsthesia is employed, the inevitable pulling on adherent omentum and dragging on the mesentery, are responsible for a considerable amount of shock even before this protracted stage of weaving is reached.

(6) *Recurrence after Operation.*—It is yet, I think, too early to be certain as to this, but, granting that the steps of the operation have been correctly carried out, I believe that recurrence is a very improbable result, in view of the solid and impermeable mass of silver wire and fibrous tissue which fills the gap. It is only conceivable in two circumstances, viz., where the loops have been placed at much too wide an interval, or where the filigree has not been made wide enough as a whole. In the former case, a protrusion might appear between the loops, and in the latter the whole filigree might bulge forward and become itself part of the wall of a fresh sac. The moral in these cases is self-evident.

(7) *Points upon which Success especially depends.*—These are to be found in:—(*a*) The most perfect asepsis. (*b*) A perfectly dry wound. (*c*) The avoidance of the use of too

stiff wire in making the filigree. (*d*) The use of Michel's clips in place of skin sutures. (*e*) The employment of only the most absolutely trustworthy catgut, or, what is even better, of removable deep sutures.[1] (*f*) The avoidance of drainage of any sort unless such is absolutely necessary.

Under the first heading I would especially urge the use of rubber operating gloves, without which there must always exist a very strong doubt as to the sterility of the hands (I write with full knowledge of much that has been recently written with a view to proving the contrary). Further, the treatment of the filigree itself, prior to insertion, must be scrupulously attended to. It is of necessity much soiled by the hands in its construction, and must, therefore, be submitted to turpentine, ether, and prolonged boiling, never being removed from the steriliser before the wound is ready to receive it, and then only by means of sterilised forceps.

Under the second heading, I believe that one of the chief causes of oozing after operation is to be found in the use of Hagedorn's, or the bayonet, or other sharp-edged needles. Only blunt-pointed and round-bodied needles should be used. They require a more vigorous effort in passing, but it is an effort which is well repaid.

With regard to skin sutures, I would point out, that leading, as they do, from a possibly infected surface about the umbilicus, or in the neighbourhood of the inguinal region, straight into a part rich in fatty and areolar tissue and freshly extravasated blood, they constitute a serious danger of infection. They can usually be dispensed with by employing Michel's clips; but, if tension on the skin compels their use, they should be passed from the deep to the superficial surface of the skin: contamination of the suture by drawing it from the infected layers of the skin into the depths of the wound is thus to some extent avoided.

In conclusion, I may say that I am aware of at least two other surgeons who have submitted cases of hernia to this method of treatment since my first case was shown. These cases, three in all, are, I am given to understand, progressing favourably; all are, however, more recent than my last reported case, and have not yet been published. In submitting these

[1] Author: *Lancet*, April 23, 1904.

results, I trust that my remarks, which I ask none to accept in blind faith, may be the means of inducing others to submit their cases, when suitable, to a method of operation which I believe to be one of the most valuable additions to modern surgical technique; and this hope is the best apology I am able to offer for the opinions I have ventured to express in this paper.

I have purposely omitted any description of the filigree as used by Dr. Willard Bartlett, or the method of manufacturing it, full details of which will be found, by those who are unacquainted with them, in the paper to which I have already referred.

INTESTINAL OBSTRUCTION IN CHILDREN: A CLINICAL STUDY.

By ARTHUR EDMUNDS, M.B., M.S., B.Sc., F.R.C.S.,
Surgeon to the Great Northern Central Hospital; Assistant Surgeon to the Paddington Green Children's Hospital.

[With Plate VI.]

THERE is perhaps no problem of greater difficulty, or one whose solution is more important, than that of deciding when an operation is to be performed in an intra-abdominal lesion.

On the one hand, we have most of us seen the patient who walks into the hospital with comparatively trivial symptoms, but who on the operating table is found to have a perforated gangrenous appendix. On the other hand, there are the cases with apparently severe abdominal symptoms, which resolve either spontaneously, or after simple treatment.

In children the difficulty is by no means diminished. Such patients, it is true, show very readily the effects of abdominal mischief, but the difficulty is to differentiate cases, in which some form of gastro-enteritis or constipation is present, from those in which there is some grave inflammatory mischief, extending beyond the lining mucous membrane of the gut and attacking the peritoneum; or in which there is some mechanical obstruction to the lumen of the bowel. For the first group, internal medication will suffice; for the second, operative interference is imperative.

In adults, the differential diagnosis may be equally difficult, but the consequences of error are not so disastrous. The surgeon who opens the abdomen of a hysterical patient may feel that he has performed an unnecessary operation, but he will have but little fear for his patient's life. He has submitted his patient to a risk which is comparatively slight. Confronted, however, with a young child, the surgeon has to face much graver issues, inasmuch as the laparotomy which he projects is an operation of very considerable severity for a child, and may result in death.

Intestinal obstruction is not very uncommon in children

and the following case well illustrates the importance of differentiating mechanical obstruction from the simpler forms of intestinal disturbance.

Maggie R., aged three years and four months, was brought to the Paddington Green Children's Hospital on July 24, 1905, with abdominal pain. In the preliminary sorting of patients, she was sent to the physicians' room among the usual crowd of children, with intestinal disturbances, who are brought to the hospital physicians during the summer months. She was seen by Dr. Sutherland, who obtained the following history :—

She had been a perfectly healthy child up to July 15, well cared for, and intelligently fed. On that day she was knocked down and run over by a hansom cab. She escaped the wheels at first, but the cab pulled up and backed, the wheels passing over the child's abdomen. She was taken immediately to a neighbouring medical man, who examined her, and advised that she should be kept at rest on a light diet. Half an hour after she was running about apparently perfectly well, and although care was taken to prevent her eating anything which was likely to upset her digestion, her parents congratulated themselves that the child had escaped injury.

The child continued in perfect health for six days, her bowels acted daily and her appetite was good. On July 21, however, she became ill and refused her food. She had pain in the abdomen, which came on in attacks of increasing severity, but without any abdominal tenderness. Constipation was absolute, no flatus even passing, and there was a certain amount of vomiting which did not relieve the pain. Abdominal distension was slight, but increasing.

The child was examined by Dr. Sutherland, who admitted her to the wards, and a few hours afterwards invited me to see her with him. The child was well nourished, but obviously ill. She had the "abdominal expression" which is so typical but so difficult to describe. This differs markedly from the profoundly poisoned look of a patient, suffering from an acute intestinal toxæmia, and was the first point to attract attention, suggesting that the case belonged to a different category. It is very hard to describe this difference, but it is a very real one. We have three factors in the production

of these facies. In the first place, there is shock, in which the muscles of expression are relaxed, producing an effect which is entirely peaceful and apathetic. The second factor is emotion, anxiety, or fear, which always accompanies an abdominal crisis. The third is loss of fluids, so that the whole face shrinks, loses its roundness and becomes wizened and aged.

All these factors may be present, but in cases like the present, the first and second dominate the picture, while in cases where there is much diarrhœa or vomiting, the loss of fluids is the most important factor.

The patient's body bore no marks of bruises from the accident, there was no tenderness, and the distension was slight. On careful examination of the abdomen, very well-marked waves of peristalsis could be seen on the right side, passing from right to left and stopping just above the umbilicus. No tumour could be felt; no free fluid; nothing per rectum. The pulse was slightly quickened, rather small but otherwise normal.

Such were the data upon which a decision had to be made, and made immediately. The point to be decided was whether we had to deal with a simple attack of constipation, with attendant sickness and colic, a condition to be relieved by an aperient; or a case of mechanical obstruction in which an aperient would be dangerous and operation imperative.

The story of the accident would have held an important place, but for the fact that it had occurred eight days before, and that there was no tenderness and no rigidity. Had there been a rupture of the bowel, we should have expected that the patient, if she had survived, would have developed an abscess; a condition negatived by the absence of rigidity and tenderness. Clearly the history of the accident threw no light on the diagnosis. The constipation, although it might seem at first sight to be comparatively insignificant, lasting, as it had done, only three days, was yet of considerable importance. There was no passage of flatus, and it occurred in a child whose bowels usually acted regularly. A sudden attack of absolute constipation of this kind was of great significance.

The vomiting would not have been of great diagnostic import, but for the fact that it had occurred in a child who, on account of the accident, was being especially carefully fed. Distension was slight, not more than the three days constipation would well account for. The peristaltic movements, restricted to one-half of the abdomen, were of great value, and their direction pointed to the fact that they were caused by movements either of the colon or of the small intestine. Colic obstruction would have caused in all probability more distension. It was this last sign, the peristalsis commencing at one definite point, and passing to another definite point, which proved our main guide, and enabled us to diagnose a mechanical obstruction, situated above and to the right of the umbilicus. Further than this, it was impossible to go, but this was sufficient to prove the necessity for laparotomy, and to indicate the site of the incision.

Accordingly the patient was anæsthetised, and the abdomen opened through the right rectus, the main part of the incision being above the umbilicus. On turning up the omentum, a tag was found adherent to the tip of a short lateral process of the small intestine. On one side of this, the bowel was slightly distended, and, on squeezing the contents onwards, an obstruction could be demonstrated at the base of the process. By a little manipulation, the intestinal contents could be made to pass the obstruction with a distinct gurgle. Clearly, there was some sort of valvular obstruction at the site of the lateral process, and resection seemed the only satisfactory method of dealing with it.

Two incisions were made with scissors enclosing the projection, and extending downwards to the mesenteric attachment. It seemed, at first sight, that this would leave a small portion of the mucous membrane of the gut at the mesenteric border. In Fig. 1, it will be seen that these incisions completely divided the lumen of the bowel in two places. The cut ends were then united by simple suture; an inner suture of catgut taking up all the coats, and an outer Lembert suture taking up only the serous and muscular coats. These sutures were interrupted at intervals to prevent the lumen from being constricted, when they were tied.

No apparatus was used as an aid to the suture; all

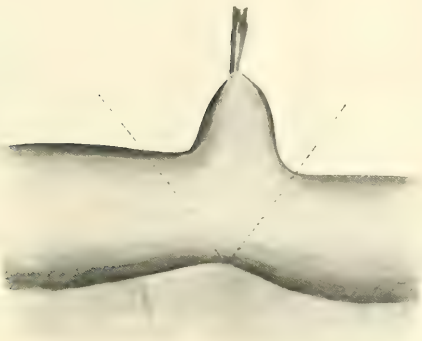

Fig. 1. *Portion of bowel showing the diverticulum with its adhesion. The dotted lines indicate the lines through which the bowel was divided. The difference in calibre between the two portions of the bowel is seen to be very slight.*

Fig. 2. *Vertical section through the portion removed after it had been hardened in formalin. The valve-like projection is seen in the middle of the drawing. The dotted lines represent the outline of the adjacent portions of bowel.*

have their respective disadvantages, and do little to shorten the operation. Plain sewing needles, held and used exactly as a woman does when she sews a seam, probably form the ideal instruments for intestinal suture.

The abdominal wound was closed in layers and dressed. The whole operation lasted thirty-five minutes.

The child was collapsed, but rallied with saline injections, and made a good recovery. When last seen, six months after the operation, she was quite well, her appetite was good, her bowels acted normally, and there was a sound scar.

The parts removed are shown in Fig. 2, in which it will be seen, that there was an acute kink of the intestine combined with great narrowing of the lumen. This formed a sort of valve, which presented a formidable, but not insuperable, obstacle to the passage of the intestinal contents. The entire absence of any indication, on the surface of the junction between the two limbs of the kink, proves that it must have been of long standing. Possibly the accident was followed by some paresis of the gut, which precipitated the obstruction.

Congenital stenosis of the small intestine is well known, and an interesting form occurs at the site of Meckel's diverticulum, which has been explained on the theory that the atrophy of the structure has progressed beyond the normal. It is possible that the present case was of this nature. The presence of the adhesion points to some inflammatory disturbance. There was, however, no sign of tuberculosis.

Cases of this kind are rare, but they bring out very pointedly the need of keeping in mind the possibility of a mechanical obstruction in cases of intestinal disorder.

The onus of these cases lies far more with the physician, or practitioner, than with the surgeon, and the credit for their recovery is much more due to the physician, who recognises them, than to the surgeon, who operates upon them.

CHOREA GRAVIDARUM.

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INTRODUCTION.

We are well aware that several exhaustive papers have been written upon the interesting association between adult chorea and pregnancy. We feel, however, that we ourselves have been taught that the prognosis, when chorea occurs in a pregnant woman, is worse than is really the case. We think it of interest to give the notes of 29 cases which have been treated in Guy's Hospital during the last 30 years. One advantage of doing this is that these cases, taken consecutively from the Hospital Records, are not selected. On this account, they probably give a more accurate idea of the danger and mortality than do statistics, compiled from the literature, in which mild cases are less likely to be published than are the graver.

SUMMARY OF 29 CONSECUTIVE CASES FROM GUY'S HOSPITAL.

CASES.

A.—Non-fatal.

Case 1.—L. B., aged 24, had been married six months, and was now pregnant six months with her first child.

History.—There had been no previous chorea, or rheumatism. The onset of the present attack was gradual at the fourth month of pregnancy. The movements were general, and became progressively worse. On admission, she was very violent and at times delirious. There was slight albuminuria; there were no cardiac bruits.

Result.—Under the ordinary medical treatment, the movements subsided within a month. She went out well, and the pregnancy continued to term.

Cause.[1]—She could assign none.

Temperature.—There was no pyrexia.

Case 2.—E. B., aged 19, was unmarried, but pregnant seven months of her first child.

History.—The patient had had acute rheumatism two years before. The choreic movements began suddenly three days before admission. They were general but mild. There were aortic and mitral bruits.

Result.—On medical treatment the movements ceased after a fortnight, and she went out still pregnant.

Cause.—Illicit pregnancy ? Rheumatic ?

Temperature.—There was no pyrexia.

Case 3.—A. B., aged 20, had been married ten weeks, and was pregnant two months of her first child.

History.—Three months before marriage, the patient was frightened by a burglar, and slight chorea set in. She recovered from this. The movements recurred, after another fright, at the end of the second week of pregnancy. They were general but mild.

Result.—Recovery was rapid and the pregnancy was unharmed.

Cause.—Attributed to fright.

Temperature.—There was no pyrexia.

Case 4.—M. B., aged 20, had been married six months and was now pregnant five months with her first child.

History.—There had been no previous chorea, or rheumatism. The present attack came on gradually at the fourth month of pregnancy. The movements were mild, and confined to the left arm and leg.

Result.—Recovery was rapid, and the pregnancy continued undisturbed.

Cause.—She could assign none.

Temperature.—There was no pyrexia.

Case 5.—E. C., aged 22, had been married several years, and had had two normal confinements. She was now pregnant three months with the third child.

[1] By "cause" we have tried to indicate the factor to which the patient herself attributed the onset of chorea. Where a ? is put the "cause" is the one suggested by us.

History.—There had been no previous chorea, or rheumatism. Choreic movements began at the end of the first month, and increased to such an extent that, on admission to hospital, she had to be placed in a padded bed. There were no bruits.

Result.—Recovery, under ordinary treatment, was rapid; and the patient left the hospital with but very slight movements in three weeks. The pregnancy continued.

Cause.—She assigned none.

Temperature.—There was no pyrexia.

Case 6.—M. C., aged 22, had been married one year and ten months. She was now pregnant for the first time, at the fourth month.

History.—She had had chorea at the age of 12. The present attack began when she was pregnant two and half months. The movements were slight, and confined to the right arm and leg. There was a local apical systolic bruit.

Result.—The attack subsided rapidly in hospital, and she took her discharge in nine days; the pregnancy continued.

Cause.—She assigned none. Rheumatic?

Temperature.—There was no pyrexia.

Case 7.—L. D., aged 27, had been married ten years and had had two children, nine and seven years ago respectively; she was now pregnant seven months.

History.—There had been no previous chorea or rheumatism. The present attack began at six and a half months of pregnancy. The movements were mild, and confined to the left side. There was well-marked mitral stenosis, with complete compensation.

Result.—The movements ceased in ten days, and four days later the patient went home, still pregnant.

Cause.—She assigned none. Rheumatic?

Temperature.—There was no pyrexia.

Case 8.—E. F., aged 21, was unmarried, but was now six months pregnant.

History.—She had had no previous chorea, or rheumatism; the present attack began at the fourth month of pregnancy. The movements were general, but mild. There was no heart lesion.

Result.—She got quickly well, going out in seven days, still pregnant.

Cause.—Illicit pregnancy ?

Temperature.—There was no pyrexia.

Case 9.—M. F., aged 23, was married, and had had two children previously without trouble. She was now five months pregnant.

History.—She had had an attack of rheumatism seven months ago. The movements began at the fourth month of pregnancy; they were general, but mild. The heart was normal.

Result.—She got quickly well, and pregnancy continued.

Cause.—None was assigned. Rheumatic ?

Temperature.—This was never above 98° F.

Case 10.—C. H., aged 20, had been married five months, and was now pregnant three and a half months.

History.—She had had one attack of chorea, lasting three weeks, two years ago. The present attack began at the second month of pregnancy. The movements were general, but mild. There was a local apical bruit.

Result.—She got quickly well, and went out in thirteen days, still pregnant.

Cause.—None was assigned. Rheumatic ?

Temperature.—There was no pyrexia.

Case 11.—F. K., aged 31, had been married ten months, and was now pregnant eight and a half months with her first child.

History.—She had had chorea once previously, in childhood. The present attack came on at the end of the seventh month of pregnancy. The movements were general but mild. The heart was normal.

Result.—The movements rapidly subsided before the birth of the child, and she went through labour naturally at term.

Cause.—None was assigned. Rheumatic ?

Temperature.—There was no pyrexia.

Case 12.—R. H., aged 21, was married, and was now pregnant at full term with her first child.

History.—She had had chorea previously at 15. The present attack began gradually at the sixth month of pregnancy.

The movements were general but mild. She attended the out patient department, improved, and left off coming. She relapsed at eight and a half months, and was then admitted.

Result.—Labour came on spontaneously at term, and during the pains there was exaggeration of the choreiform movements. The child lived. The chorea in the mother subsided quickly. The lochia became foul. The temperature rose to 100° F. Notwithstanding local peritonitis, the patient made a good recovery.

Cause.—None was assigned. Rheumatic?

Temperature.—There was no pyrexia.

Case 13.—M. B., aged 17, was married, and now five months pregnant with the first child.

History.—She had had chorea before, when a child; and one attack of acute rheumatism a year ago. When nearly three months pregnant she fell downstairs, and was very much frightened. The present chorea dated from this. The movements were general and of moderate severity. There was a local apical systolic bruit.

Result.—After two weeks in hospital, the movements had quite ceased. She went out, the pregnancy continuing normally.

Cause.—Fright. Rheumatic?

Temperature.—Never above 98·6° F.

Case 14.—L. M., aged 20, had been married six months and was admitted when two months pregnant with her first child.

History.—There had been no previous chorea, or rheumatism. The movements began at the end of the first month, they were general and severe. There was no heart lesion.

Result.—She remained in hospital 17 days, and went out well; the pregnancy continued.

Cause.—None was assigned.

Temperature.—There was no pyrexia.

Case 15.—E. P., aged 27, was unmarried, but pregnant four and a half months.

History.—She had had chorea and acute rheumatism

previously, at 13 and 15 respectively. She had well-marked mitral stenosis. The movements began in the middle of the third month; they were general, and of moderate severity.

Result.—She lost her chorea in 27 days from admission. The pregnancy continued.

Cause.—She assigned none. Rheumatic?

Temperature.—This was for the most part normal or subnormal, but on three occasions in four weeks was 99° F.

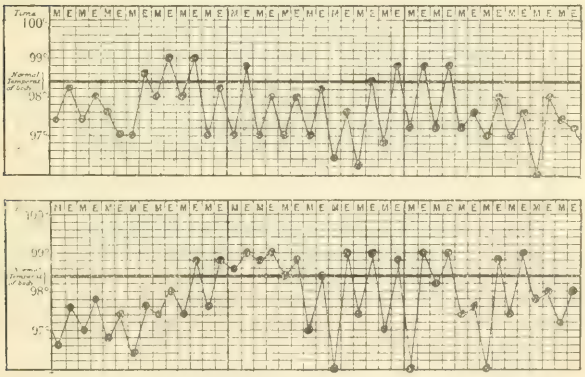
Case 16.—E. P., aged 20, had been married nine months, and was now pregnant seven months of her first child.

History.—She had had chorea at 14; but no acute rheumatism. The present attack began at the fifth month; the movements were general, but not so severe as in her previous attack. The patient was able to feed herself.

Result.—Labour was induced soon after admission; the movements became more violent after the induction, and the patient was so ill that she was not able to leave the hospital for 53 days; slight choreic movements were still present on her discharge.

Cause.—She assigned none. Rheumatic?

Temperature.—There was no pyrexia above 99° F.


Temp.
100°
99°
Normal Temperature of Body
98°
97°
M E M E M E

Case 17.—H. S., aged 25, was married and had had four children; she was eight months pregnant of her fifth child on admission.

History.—She had had chorea severely at 18, before marriage; and was in hospital for it four months. She had a second attack with her first pregnancy, beginning at the fifth month, and lasting until a month after delivery of a living child at full term. There had been no recurrence with the second, third and fourth children. There had been no acute rheumatism, and there was no heart lesion. The present attack began gradually about the middle of pregnancy; the movements were general and moderately severe.

Result.—She went to full term, and was delivered in hospital of a living child. The movements improved greatly after delivery, and she went out nearly free from them a fortnight after labour.

Cause.—She assigned none. Rheumatic?

Temperature.—There was no pyrexia.

Case 18.—E. W., aged 21, was unmarried, but pregnant four and a half months of her first child.

History.—There had been no previous rheumatism or chorea. The heart was normal. The present attack began at the second month of pregnancy. The movements were general but mild.

Result.—She improved quickly, and was in hospital 17 days. The pregnancy continued.

Cause.—She assigned none.

Temperature.—There was no pyrexia.

Case 19.—E. Y., aged 23, had been married four years, and had had one child. She was now three months pregnant of the second.

History.—There had been no previous rheumatism; but at the second month of her first pregnancy she had chorea, which lasted three weeks. She got quite well of it, and bore a living child at term. The present attack also began at the second month. The movements were general but mild. The heart was normal.

Result.—She got rapidly better, and the movements had almost ceased when she went out in four days. The pregnancy continued.

Cause.—She assigned none.

Temperature.—There was no pyrexia.

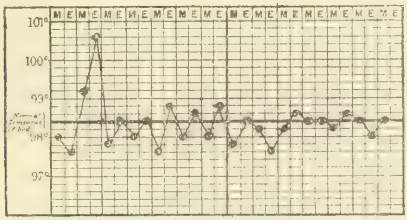
Case 20.—A. W., aged 30, had been married twelve months, but had had one child before marriage without chorea. She was now pregnant eight and a half months of her second child.

History.—She had had five previous attacks of chorea, in childhood, but no acute rheumatism ; the heart was normal. The present attack began when she was seven months pregnant. The movements were general and of moderate severity.

Result.—The child was spontaneously born dead soon after admission. The movements rapidly ceased, and the patient went home in fourteen days.

Cause.—She assigned none. Rheumatic ?

Temperature.—Normal before delivery, it rose to 100·4° F. the evening of delivery, and after that never exceeded normal.



* Day of delivery.

Fig. 2. *Temperature chart of Case* 20.

Case 21.—M. J., aged 25, had been married ten years, and had had two children before admission. The first was born dead at the eighth month, eighteen months after marriage ; the second was born dead at the fifth month, a year ago. She was now pregnant at the fifth month. There was no cardiac bruit.

History.—Within a year of marriage, she had her first attack of acute rheumatism, followed by chorea ; the latter had not quite ceased when she became pregnant. The choreic movements then increased in severity, particularly from the

second month, and lasted until a month after this first child was born. Chorea recurred at the second month of the next pregnancy, and ceased a month after the miscarriage. Movements again came on at the second month of the third pregnancy; they were moderately violent, and persisted, unaltered, until six and a half months, at which time the fœtus died in utero.

Result.—The dead fœtus was retained till the seventh month, when it was expelled in a macerated condition. The chorea, though less violent from the time of fœtal death, was still present in mild degree upon discharge a fortnight after delivery.

Cause.—She assigned none. Rheumatic?

Temperature.—This remained normal throughout.

(*Note.*—It was thought that the fœtus might have been poisoned by the arsenic used in the treatment of the other. The placenta and fœtus were both examined for arsenic, but none could be detected.)

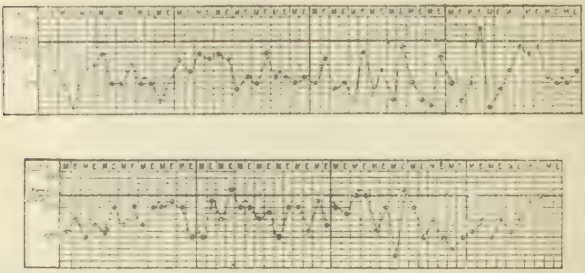


Fig. 3. *Temperature chart of Case 21, shewing absence of pyrexia in non-fatal case, notwithstanding presence of dead fœtus in utero.*

Case 22.—S. F., aged 22, had been married five years, and had had two children without chorea. She was pregnant seven months of her third.

History.—She had had no previous acute rheumatism, or chorea. The present movements began at the fourth month. She attributed them to nervousness following the long illness

and death of her second child. The chorea was violent and constant. There was no definite heart lesion.

Result.—After eighteen days in hospital the movements were so much relieved that she chose to go home, still pregnant.

Cause.—Worry.

Temperature.—There was no pyrexia.

Case 23.—L. G., aged 20, was married, and now pregnant seven months of her second child.

History.—She had had no chorea, nor acute rheumatism before marriage. During her first pregnancy, following a severe fright given her by her husband, she had slight chorea, which persisted until delivery of a living child at term, when the movements gradually ceased. During this second pregnancy the chorea recurred, beginning at the first month, and never becoming very severe.

Result.—The movements were less on discharge from hospital, but persisted till full term, when a living child was born.

Cause.—Fright, in the first instance; she assigned none in the second.

Temperature.—This remained normal throughout.

Case 24.—E. B., aged 30, had been married a year and a half; had had one child born alive at full term without chorea, and was now pregnant again at the third month.

History.—She had had chorea in childhood, following a fright, and had had acute rheumatism shortly before marriage. The present attack of chorea, which was accompanied by slight rheumatism, began in the second month of the second pregnancy.

Result.—The movements were general, and moderately severe; the patient went home nearly free from them, and still pregnant.

Cause.—She attributed the chorea to worry at the death of her first child. Rheumatic?

Temperature.—This never exceeded 99° F.

Case 25.—E. S., aged 20, was married, and was now pregnant six months of her first child.

History.—The father died of acute rheumatism and heart disease. A year before marriage the patient had her first

attack of chorea; the choreic movements had never completely ceased. They were exaggerated from the first month of the present pregnancy, but were never severe.

Result.—She went out still pregnant, slight chorea being still present.

Cause.—She assigned none. Rheumatic?

Temperature.—There was no pyrexia.

Case 26.—B. S., aged 26, was married, and was now pregnant seven months for the first time.

History.—She had had chorea as a girl. The present attack came on at the sixth month; the movements were general, and moderately severe. There was mitral regurgitation.

Result.—The movements gradually diminished, but were still slightly present when she went home still pregnant, after being in hospital 30 days. The child was born alive at full term.

Cause.—She assigned none. Rheumatic?

Temperature.—During the 30 days that she was in the ward the temperature once rose to 99·4° F., once to 99·2° F.; for the rest it was normal.

B.—*Fatal.*

Case 27.—A. H., aged 21, had been married four months, and was pregnant three and a half months for the first time.

History.—She had had three separate attacks of chorea in childhood. The present attack began acutely just before admission. The movements became so violent that she had to be watched day and night in order to keep her in bed.

Result.—She became semi-comatose, and aborted on the day following admission. She died the day after the abortion.

Cause.—She assigned none. Rheumatic?

Temperature.—This was 100° F. on admission, and rose to 105° F. before death.

Autopsy.—There were acute recent endocarditis and parotitis; cultivations made from heart-blood, spleen, and cerebro-spinal fluid all remained sterile.

Case 28.—R. D., aged 21, had been married four months, and was pregnant at the second month for the first time.

History.—She had had no previous chorea nor acute rheumatism. The present chorea began at the second week of

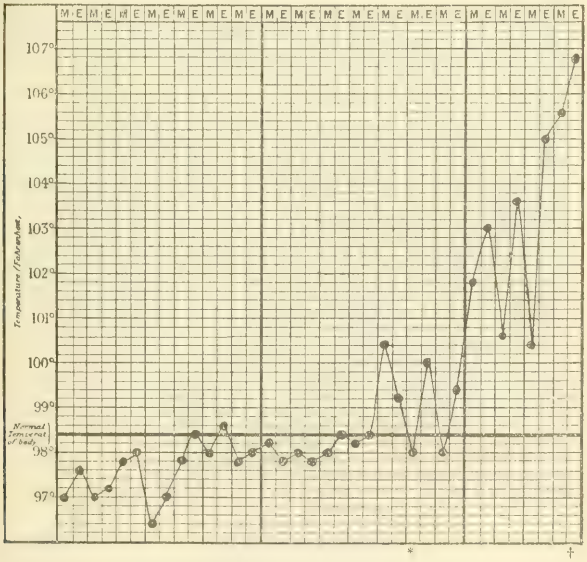
pregnancy. The movements were slight at first, and got worse gradually. On admission she was so violent and noisy that she had to be taken to the strong room. Nasal feeding was resorted to, the choreic movements being controlled by chloroform. She was emaciated. There was no bruit.

Result.—The uterus was evacuated after rapid dilatation under chloroform; the patient seemed quieter next day. The chorea ceased, but the patient became collapsed, and died on the fifth day after the uterus was emptied.

Cause.—She assigned none.

Temperature.—(*Vide* chart.)

Autopsy.—There were recent vegetations all along the mitral valve; there were no infarcts. Cultivations of the heart-blood showed bacillus coli communis only; cultivations from the spleen remained sterile after incubation for three days at 37° C.



* Forcible evacuation of uterus. † Death.

Fig. 4. *Temperature chart of Case 28, showing pyrexia in a fatal case.*]

Case 29.—G. H., aged 23, had been married six years, and had had three children without chorea. She was now pregnant six and a half months.

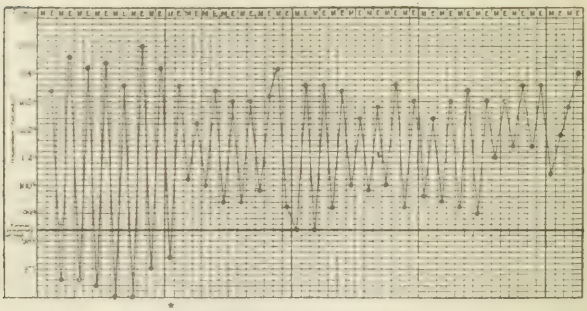
History.—She "had never been ill in her life before," but there was a local apical systolic bruit. The chorea began about the middle of this pregnancy. Two weeks before admission, illness began suddenly with a "fit" accompanied by coma and transient right-sided hemiplegia. On recovery, slight choreic movements set in, affecting both sides, but mainly the right side.

Result.—She became extremely ill, with rigors. The chorea was never more than slight. She miscarried eight days after admission, and died three weeks later. Her clinical condition was one of infective endocarditis.

Cause.—She assigned none.

Temperature.—(*Vide* chart.)

Autopsy.—There was old mitral stenosis, with more recent fungating endocarditis. There were general infarcts, embolism of left middle cerebral artery, and thrombosis of the left iliac and femoral veins.



* Spontaneous miscarriage.

Fig. 5. *Temperature chart of Case* 29, *showing pyrexia in a fatal case.*

Pathology.

It has been suggested that chorea gravidarum has a different pathology to ordinary chorea of childhood. It is naturally very difficult to gainsay such a suggestion, seeing how little is

known of the pathology of either. That chorea of children is a manifestation of acute rheumatic infection is now generally believed. The same organism has been isolated both in acute rheumatism and in chorea. It is still controversial whether this diplococcus is specific. If chorea has a bacterial origin, to prove that chorea gravidarum and that of children were one and the same, it would be necessary to find the same organism in both. This has not yet been done. Cultivations were made post-mortem in two of our cases (27 and 28), but no growth resulted. This aspect of the evidence, therefore, is negative. But out of our total 29 cases, no fewer than 19 had had rheumatism or chorea, previously, and of these, 15 had had chorea before marriage. This is so large a proportion of the whole that we feel convinced that chorea gravidarum and infantile chorea have a similar pathology. Were we to give the family histories, the rheumatic nature of chorea gravidarum would come out more strongly still.

Many writers lay stress upon illicit pregnancy as a cause. Of this we are by no means convinced. Of our 29 cases, 4 only were unmarried. We do not know the proportion of illicit pregnancies in young women in the borough ; but we do believe that, considering the ages and the status of our patients, the proportion of 4 out of 29 is not high enough to justify the dogma that illicit pregnancy even predisposes to chorea.

We are quite ready to admit that nervousness of disposition, anxiety, fright, and worry all tend to accentuate choreic movements, but we do not hold that they actually produce chorea. Indeed, we are not sure but that the neurotic manifestations are the result of the rheumatic toxæmia.

General Remarks.

We are in agreement with other writers on this subject, that the age of the patients is young ; that primiparous women are more often affected than are multiparous ; and that there is a tendency to recurrence in successive pregnancies.

In regard to age, only three of our cases were as old as 30. The majority were about 20. Eighteen out of the 29 were primiparous ; five were in their second pregnancy ; four in their third ; and one each in the fourth and fifth.

The tendency to recurrence is distinct, as is seen in

Cases 17, 19, 21 and 23. We would point out, however, that it is possible for chorea to occur with one pregnancy, then to be absent with one pregnancy or more, and to recur at a later one. In Case 17, for example, chorea occurred with the first pregnancy, was absent in the second, third and fourth, but recurred in the fifth.

It must also be noted that it is by no means safe to say that chorea will not occur in a second or third pregnancy when it has not occurred with the first. In Case 29, for example, there was no chorea after marriage until the fourth pregnancy. In Cases 5, 9 and 22, there was no chorea till the third pregnancy. In nine of our 29 cases, the first pregnancy was free, yet chorea occurred during a later pregnancy.

Chorea may occur at any time during the carrying, but an attack is distinctly less likely to begin during the later months. We find that—

Choreic movements began—

During the	1st	month, in	5	cases (one died).
„ „	2nd	„	5	„
„ „	3rd	„	4	„ (one died).
„ „	4th	„	5	„
„ „	5th	„	3	„ (one died).
„ „	6th	„	2	„
„ „	7th	„	4	„
„ „	8th	„	0	„
„ „	9th	„	0	„

In one they began before conception.

When chorea recurs in successive pregnancies, it is prone to begin at the same month each time.

Prognosis.

The mortality amongst the mothers is certainly greater than is that amongst choreic children, but we feel certain that it has been over-estimated by many writers. We believe that too much stress is usually laid upon the gravity of chorea in pregnancy. In Barnes' classical paper, the mortality was given as 43 per cent. Buist, who has collected a very large number of cases, gives the mortality as 20 per cent. We think the reason of these high figures is that they are based mainly upon cases that have been collected from many

different sources in the literature. It is natural that the milder cases escape from such statistics, because they would not seem to be of sufficient interest to be published individually. We think that cases from the same hospital, taken consecutively, afford a better basis for determining the mortality, even though the numbers dealt with are much smaller than those in some previous papers.

Even with hospital patients, it must be remembered that all the more serious cases will be admitted, whereas some of the milder ones may be seen only in the out-patient department. This would tend to render the mortality amongst our cases, who were admitted to the wards, higher than it ought to be.

Even so, we have only 3 deaths out of 29, or 10 per cent. In our last case it will be seen that there was evidence of the chorea being possibly a post-hemiplegic condition from already existing fungating endocarditis and cerebral embolism. The clinical condition was one of fungating endocarditis. If this exceptional case be excluded, the mortality is 2 in 28, or only 7 per cent.

The Importance of Pyrexia.

There is one point which we think very important, and one to which we cannot find attention drawn in the literature; and that is the significance of pyrexia in the prognosis of chorea gravidarum. As will be seen, on referring to the abstracts of cases, not a single one of the 26 patients who recovered had temperatures above 99° F. In the majority, indeed, the temperature was slightly subnormal. In all the fatal cases, on the other hand, there was marked pyrexia (*vide* charts); in one case persisting for over four weeks; in another for one week; and in both cases preceding the birth of the fœtus. That the intra-uterine death of the child need not be the cause of pyrexia is shown by cases 20 and 21, where there was no pyrexia, although the fœtus had been dead *in utero*, and in one case was macerated.

Our cases are too few to generalise upon, but so striking is the presence of pyrexia in our fatal cases, and its absence in those which recovered, that we consider that a rise of temperature above 100° F. in a patient suffering from chorea gravidarum

would justify a grave prognosis, if no obvious acute tonsilitis or other such cause for the pyrexia could be found. On the other hand, we should feel happy as to the immediate prognosis of the patient, so long as the temperature remained normal; and this regardless of the severity of the choreic movements. The chorea was very severe in seven of our cases; of these five had no pyrexia and recovered, two had pyrexia and died.

To use a comparison, one might say that "simple" chorea gravidarum is to fatal chorea gravidarum as "simple" endocarditis is to fungating endocarditis.

Treatment: The Question of Induction of Labour.

The majority of cases do well when treated in exactly the same way as non-pregnant cases of chorea. If labour is to be induced at all, our remarks above indicate that it must be done before the onset of pyrexia. It is impossible to judge by the movements alone, whether the case will end badly or well. Even of the severe cases, as we have mentioned, the greater number (5 out of 7) got well without termination of the pregnancy. Moreover, induction of labour in the bad cases is not a specific cure for the condition. We think, therefore, that it is unwise to induce labour simply because the movements are severe, and we think it too late to induce labour when pyrexia has set in. So difficult is it to decide when induction may do good, that we hold that it is seldom the line of treatment to be adopted.

In other words, the patients should be treated as though suffering from chorea without pregnancy.

We offer our best thanks to the Treasurer and to the Physicians of Guy's Hospital for their kind permission to make use of the notes of the cases embodied in this paper.

THE SURGICAL ASPECTS OF COLITIS.

By P. LOCKHART MUMMERY, B.C., F.R.C.S.,

Hon. Surgeon, King Edward VII. Hospital for Officers; Assistant Surgeon, St. Mark's Hospital; and Surgeon to Out-patients, North-Eastern Hospital for Children.

[With Plate VII.]

COLITIS is a term which has been very loosely used to describe a great many different diseases, and one is almost tempted to place it in the same category as chronic rheumatism and suppressed gout.

Many observers have divided colitis into different varieties, such as Mucous colitis, Membranous colitis, and Collica mucosa, but, however carefully the different forms of colitis may be classified, the word is generally used to describe any condition of the large bowel which is accompanied by colicky pains and diarrhœa, accompanied by the passage of mucus, more especially if these symptoms are chronic or persistent.

Colitis in some form or another is a common disease, and at the same time one which it is frequently difficult to treat successfully.

The first point that I wish to insist upon is that colitis should be looked upon as a symptom rather than as a disease, and that we should never be contented to label a case as colitis until some definite cause has either been found for it or most carefully excluded. For the purpose of this paper I shall simply divide colitis into two varieties.

(1) *Primary Colitis*, by which is meant cases in which the cause is some diffuse diseased condition of the colon, and in which the colitis is really a disease and not a symptom.

(2) *Secondary Colitis*, by which is meant cases in which the colitis is due to some circumscribed disease in the colon, or outside it, or is merely part of some constitutional malady.

The first point of importance is the diagnosis. Hitherto it has too often been the custom to diagnose colitis from the symptoms alone; a most dangerous practice with any disease, and more especially so with colitis.

Whenever a patient complains of symptoms of colitis, that

is to say, when a patient complains that he is suffering from diarrhœa, either continuous or intermittent, colicky pains in the abdomen, loss of blood per rectum, or the passage of mucus or slime, we should not be satisfied until a careful examination has been made in order to ascertain the cause for such symptoms as these, and it is only by a careful examination and accurate diagnosis that we can hope to be successful in the treatment of such cases.

Diagnosis.—The symptoms should of course be carefully gone into, but too much importance must not be attached to symptoms alone. Careful examination should be made of the abdomen, especial attention being paid to the region of the appendix, gall, bladder, and kidneys.

The large intestine should be carefully palpated throughout its length, and any rigidity or tenderness noted.

The presence, or otherwise, of fæcal accumulations should be ascertained, and in fact a careful examination of the whole abdomen should be made in order to ascertain whether there is any abdominal condition present to which the symptoms of colitis may be secondary. In some cases it is advisable to administer an anæsthetic for the purpose of examination.

A certain amount of information may also be obtained by an examination of the fæces and discharges.

It is also a good plan to have a microscopical examination of discharges made at some good clinical laboratory. The presence of tubercle bacilli, or pus cells, or the Bilharzia parasite, or the amœba of dysentery (if the patient has contracted his trouble abroad) are important points.

The local examination is, however, the most important factor in arriving at a correct diagnosis.

A careful digital and bimanual examination of the rectum should be made in order to ascertain if there is any local trouble which may account for the symptoms. This is most important, as it is quite astonishing how closely the symptoms of colitis may be imitated by rectal disease.

It is not possible with the finger to do more than examine the last 4 or 5 inches of the rectum in the ordinary way, though by getting the patient to assume the squatting position and strain down it is frequently possible to examine the bowel for as much as 7 or 8 inches from the anus.

By the use of the electric sigmoidoscope, however, the bowel can be thoroughly examined from the anus to beyond the middle of the sigmoid flexure, and if any lesion is present in this part of the bowel it can be seen. An examination with the sigmoidoscope also enables us to see the condition of the mucosa, and this may afford valuable information in some cases of colitis.

It is my firm belief that, unless some definite cause for the symptoms of colitis has been discovered by other means, no case of colitis should be considered to have been properly examined, unless the sigmoidoscope has been used, and the presence of a growth or other local lesion in the lower portion of the bowel has thus been definitely excluded.

I am convinced that there are cases in which it is absolutely impossible to distinguish, from the symptoms, between simple mucous colitis and malignant disease of the bowel, unless an examination with this instrument is made or an exploratory laporatomy performed.

I can best illustrate this by means of cases.

Case 1.—E. C., a woman, aged 42, married and the mother of five children. She said that about three months ago she began to suffer from looseness of the bowels. The bowels acted several times a day, and the stools were fluid and contained large quantities of slimy mucus. She had slight colicky pains in the abdomen at times. She *had never seen any blood* in the stools. At the time when I saw her the bowels were acting six or seven times a day, and the stools consisted of large quantities of thick slimy mucus and a small amount of fæcal material.

For six weeks before I saw her she had been under treatment at one of the general hospitals for mucous colitis without benefit. The case seemed to be one of colitis, and a local examination of the rectum revealed nothing abnormal. On passing the sigmoidoscope, however, I found a cancerous structure situated at the end of the sigmoid flexure just above the brim of the pelvis. I was subsequently able, with care, to just feel the growth per abdomen, but I think it would have been missed except for the sigmoidoscopic examination. With the sigmoidoscope it seemed to be movable, and I came to the conclusion that it could be removed "per abdomen."

At the operation, however, secondary deposits in the abdominal glands were discovered, which negatived any attempt of removal, and a colotony was therefore performed.

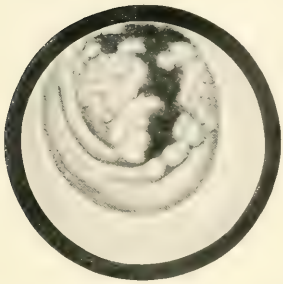
Case II.—The patient was a man, aged 63, who was under my care at St. Mark's Hospital in November, 1904. Eighteen months before I saw him he had an attack of diarrhœa accompanied by considerable pain, which lasted for about six weeks and then stopped. There was no blood in the stools. Two other similar attacks of diarrhœa and pain had occurred between this and when I first saw him; and during the two last attacks he noticed a little blood with the stools on one or two occasions. On examining his rectum with the sigmoidoscope, I found a papilloma, about the size of a five-shilling piece, situate on the posterior wall of the rectum and between the middle and upper Houston's valves. I subsequently removed the growth (which on microscopical examination was found to be a papilloma) from behind by excision of the cocyx and restored the rectal wall. The patient made a good recovery, and has remained well since.

A case is reported by Dr. Pye Smith in the *Transactions of the Pathological Society*, Vol. XLVII., p. 52, which is very similar to my first case. The patient was a woman, aged 50, in Guy's Hospital. She had been suffering for over a year from constipation with distension of the abdomen and occasional attacks of diarrhœa. During the whole time she had been passing at frequent intervals large soft gelatinous shreds and more or less complete mucous casts per anum. She had griping pains, and there was visible peristalsis of the intestines. A microscopical examination of the casts showed that they consisted of mucin. The patient died, and at the post-mortem examination it was discovered that she had a cancerous stricture at the commencement of the sigmoid flexure. The colon, both above and below the stricture, was greatly thickened and distended. After removing the adherent mucus, the mucous membrane of the colon was found to be normal, except at the side of stricture.

Dr. Pye Smith mentioned other similar cases, one of Mr. Hutchinson's and one of Dr. Goodhart's.

These cases show, I think, that the typical symptoms of mucous colitis may exist with a malignant growth of the

PLATE VII.



The growth in Case I. as seen with the sigmoidoscope.

The growth in Case II. as seen with the sigmoidoscope.

bowel, and that, without a careful local examination, it is impossible to differentiate a case of simple mucous colitis from one of malignant disease of the bowel.

One aid in arriving at a correct diagnosis in these cases must be specially mentioned. For all difficult cases the patient should be kept in bed and carefully watched for some time, repeated examinations being made of the abdomen, character of the stools, etc., and the bowels well emptied by enemata.

In some cases, when all other means have failed, an exploratory laparotomy may be performed.

It is very important to bear in mind that colitis may be merely a symptom of some other abdominal condition, or at least that it may be accompanied by some such condition which, if not the cause, is an important complicating factor.

One of the most important is appendicitis. Mr. Lockwood has recently drawn special attention to this in a paper published in the *British Medical Journal*.

In some cases a chronically inflamed appendix is undoubtedly the cause of the colitis, and the removal of the appendix has been followed by a cure of the colitis. In some cases the colitis is the only symptom complained of, and the condition of the appendix has been long unsuspected, until attention was drawn to it by a localised attack of pain, or it was discovered accidentally while examining the abdomen.

In one case in which I removed the appendix for chronic colitis, I found the end to be adherent in Douglas's pouch and a firm band of adhesions between the sigmoid and the posterior bladder wall.

In some cases a long appendix may be found passing across the sigmoid and adherent at its tip in Douglas's pouch, and the appendix itself causing constriction of the sigmoid. In other cases when the appendix is situated in the pelvis extensive adhesions have formed between it and some portion of the sigmoid flexure, binding the latter down and preventing the normal peristaltic movements.

In some cases the starting point of the colitis may be inflammation of the gall, bladder, or ducts. The colitis may be set up by the inflammatory process spreading directly to the walls of the colon at the hepatic flexure, or the colitis

may result from the interferences with the functions of the colon caused by adhesions in the neighbourhood of the gall bladder.

There are certain cases of colitis where the cause of the trouble would seem to be a freely movable kidney. Thus Tuttle, Beck, and others have recorded cases where a chronic colitis was found to be associated with a movable kidney and on fixing this organ by nephrography the colitis disappeared.

In women inflammatory conditions of the ovaries or tubes may be the cause of a chronic colitis. In such cases laparotomy will often reveal a chronically inflamed condition of the pelvic colon, with extensive adhesions and evidence of recent or old tubal inflammation.

A rare cause of secondary colitis is abdominal aneurysm. It would seem that an aneurysm of the abdominal aorta may give rise to symptoms of colitis, either by pressure upon the bowel, or by the involvement of the bowel in the adhesions about the aneurysmal sac. Tuttle quotes 6 cases of intractable colitis associated with abdominal aneurysm.

In some severe cases of colitis, associated with chronic constipation of very long standing, adhesions are found binding down the colon almost throughout its entire length. The exact manner in which these adhesions are formed is not clear, but it would seem to show that there is some active inflammatory conditions of the coats of the bowel at some stage in the history of the case.

COLITIS SECONDARY TO SOME CIRCUMSCRIBED DISEASE WITHIN THE COLON.

Of these causes for colitis by far the most important is malignant disease.

As I have already pointed out, it is impossible, except by a direct examination, to exclude the presence of malignant disease in a case where symptoms of colitis exist.

The age of the patient is of little value. I recently operated upon a man of 36, who had symptoms which might have been due to colitis, but who was suffering from a malignant growth high up in the bowel. And I have seen a patient of 16 with malignant disease of the rectum.

The importance of always carefully excluding the presence

of a malignant growth, in cases when a patient complains of symptoms of colitis, cannot be too strongly insisted upon. It is only by the early recognition of the presence of such growths that we can hope to be successful in dealing with them by surgical means.

It is now possible to successfully excise cancer from any portion of the rectum or colon, however far it may be situated from the anus, if only the operation can be done before the growth has had time to invade surrounding tissues, and cause secondary deposits.

Multiple Adenomata.—Another cause of colitis, which is rarely met with, is multiple adenomata of the mucous membrane of the colon. This is a very curious disease, and a comparatively small number of cases are on record. The adenomata somewhat resemble the adenoid growths in the naso-pharynx. They may be present in great numbers in the colon, affecting, more or less, the entire mucosa, or certain portions only may be affected; the commonest situations being the rectum and sigmoid flexure. The symptoms are those of a severe colitis. There is often much blood in the stools, but in a few cases there has been none. The diagnosis is easily made with the sigmoidoscope, and can sometimes be made by a rectal examination. The treatment is very difficult, and usually unsatisfactory. Lilienthal's case is the most remarkable. The whole colon was affected, and he ultimately cured the patient by the excision of the entire large intestine.

Tubercular Ulceration.—Among other localised causes for colitis, tubercular ulceration may be mentioned, although it is not a common cause.

The presence of tubercular ulceration high up in the rectum may be detected by direct examination with the sigmoidoscope and by microscopical or bacteriological examination of the discharges.

Actinomycosis is still rarer, but two cases of this disease causing colitis are reported by Beck.

Other causes of colitis, which are of considerable importance, and which must always be borne in mind, but which hardly concern this paper, are such constitutional diseases as Bright's disease, acute pneumonia, general sepsis and diabetes.

A rather remarkable case of acute colitis associated with acute nephritis and fatal uræmia was recorded in the *Lancet* of June 17th last.

Ulcerative colitis is a most serious condition and not infrequently has a fatal issue. It is one of the most difficult conditions to treat successfully that we can meet with.

In a few cases marked improvement follows irrigation of the colon with astringent or antiseptic lotions combined with a suitable dietary and attention to improving the patient's general health. Often, however, the disease soon reappears.

The best method of treatment in bad cases, and in those which do not react to treatment, is, I believe, a right inguinal colotomy or cæcotomy, but to be successful this operation should be performed before the patient has gone too far down hill.

By giving complete rest to the colon and allowing more effectual irrigation, it not infrequently brings the disease to an end, and if successful the opening can later on be closed again by a second operation.

Perforating simple ulcer of the colon is a disease which is not even mentioned in the text-books of the present day, and which surgery has not yet begun to treat successfully.

Yet Quenu and Duval, in 1902, collected 25 cases of perforating simple ulcer of the large intestine, and it is an astonishing fact that of these 25 cases, all were fatal, and in only one was the diagnosis made previous to death. In that one case an operation was performed, but the patient did not survive.

Dr. H. D. Rolleston, in a valuable paper entitled "Pericolitis Sinistra," mentions several such cases in which an ulcer in the colon or sigmoid flexure perforated the wall of the bowel and caused either a localised pericolic abscess or general peritonitis. In these cases the ulcer is generally a stercoral ulcer, situated either in the wall of the colon or in a false diverticulum. Beer, mentioned by Rolleston, quotes four cases of perforation of a false diverticulum into the peritoneal cavity.

These cases of perforating ulcer of the colon are probably not nearly so rare as the recorded cases would seem to show, but the diagnosis is at present difficult, and, in consequence,

up to the present time surgery has been able to do but little to save the sufferers from this disease. Early operation would, of course, afford the only chance of saving such patients, but, in the absence of an early diagnosis, this is out of the question.

The presence of a simple ulcer of the colon may be suspected when a patient complains of pain which is localised to one particular spot in the course of the large bowel. The pain usually comes on several hours after taking food, or just before the act of defæcation. In a few cases localised tenderness can be detected on abdominal palpation.

When perforation of the ulcer occurs, the symptoms are similar to those of a perforated gastric ulcer, except that the collapse is usually not so marked.

Conclusion.—1. Colitis should be looked upon as a symptom rather than a disease. A careful examination should be made, if possible, with the sigmoidoscope, and the cause of the colitis should be carefully determined before any treatment is adopted.

2. If the colitis is due to disease in some neighbouring organ, such as the appendix, kidney, or gall bladder, etc., this condition should be treated by operation.

3. If the colitis is secondary to malignant disease in the bowel, operation at the earliest possible moment affords the only chance of cure, and an early diagnosis is here of the utmost importance.

4. If it is due to some local lesion, such as tubercle or actinomycosis, it must be treated locally; if necessary, by operative means, such as colotomy or entero-anastomosis.

5. True mucous colitis is best treated by Von Noorden's method of dietary, combined, if necessary, with irrigation of the colon.

6. In some very obstinate cases, and especially in cases of ulcerative colitis, a temporary cæcotomy, or colotomy, or entero-anastomosis seems to be the only method of cure, but should not be adopted until a careful trial has been made of palliative treatment.

SYNCYTIOMA MALIGNUM.

AN INSTRUCTIVE CASE.

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[With Plates VIII.—IX.]

Syncytioma malignum, or chorio-epithelioma, is a disease of great malignancy and of peculiar interest. It is a malignant growth arising in fœtal structure, and is probably the earliest malignant neoplasm to which the embryonic tissues are liable. Not only is the life of the fœtus often destroyed thereby, but, because of the relation of the chorion to maternal structure, and the rapid invasion of the latter by malignant cells, the life of the mother is equally endangered. The growth, though epiblastic in origin, and epithelial in nature, behaves like a mesoblastic sarcoma, for it tends to spread through the blood-stream and form metastases rather than by lymphatics to invade lymphatic glands. It is indeed a malignant growth, which in many respects bridges over the differences between sarcomata and carcinomata, and proves how difficult it is to arrange malignant growths either from a clinical, or from a histological standpoint.

I am recording this case, however, not because it contributes anything new to the pathology of syncytioma malignum, but because of the clinical lessons brought out during its insidious yet tragic career, lessons which I trust the author may never forget, and which may prove of value to his fellow practitioners under similar conditions.

E. S., æt. 33, housewife, married sixteen years. During this time she had given birth to five full-time children, and had had two miscarriages, both occurring at the sixth week. The miscarriages came between the fourth and fifth child. All her labours were natural, the last, or fifth, having taken place thirteen months prior to her admission to hospital.

The patient has always had a comfortable home and, beyond a slight attack of pleurisy at the age of 15, has not suffered from any serious illness. Her father died at 41 from apoplexy, mother died at 49 from heart disease, nine brothers

died in infancy, and four are living and healthy. The patient's catamenia began at the age of 13, and had been perfectly regular until four months ago.

The history of the present illness goes back exactly four months from the date of her admission to hospital on March 31, 1905. She was sent up to my out-patient department by Dr Oliver, on the morning of that day, complaining of flooding. The story was that, in December 1904, she had an attack of fever associated with shivering fits, aching pains all over the body, and a slight flooding which lasted four days. Up to that time her periods had been regular and normal. From that date (December 1904) up to the day I saw her she had been losing a little almost daily. There was little or no pain, except occasionally, when a sharp bearing-down pain was experienced, which was almost always followed by the passage of clots from the vagina. For quite three months she had been attending as an out-patient at another hospital, where she appears to have been treated as a case of abortion, followed by endometritis.

The patient was plump, well nourished, but very anæmic. Her pulse was 136 per minute, and her temperature 101°. On abdominal examination, little or nothing could be discovered to account for her symptoms. On vaginal examination, however, it was found that the os would admit one finger which could touch what appeared to be the lower end of a soft polypoid growth within the uterine cavity. The uterus was uniformly enlarged, freely movable, and not tender on palpation. The appendages could not be palpated. A reddish brown putrid discharge came away on the examining finger.

Thinking that the case was either one of sloughing uterine polypus, or incomplete abortion with septic infection, I recommended her for urgent admission. She was admitted under the care of my senior colleague, Dr. Thomas Wilson. As her temperature rose in the early part of the evening to 106°, with a pulse of 168 per minute, the house surgeon was instructed to empty the uterus under the supervision of the resident surgical officer. The polypus was found to be single, soft, and attached to the uterus high up. It was removed with ovum forceps, and was said to consist of gangrenous placental tissue. The uterus was then curetted with a sharp

curette, and tincture of iodine was applied to the endometrium. There was a considerable amount of hæmorrhage at the operation, for which the vagina was firmly tamponated. From this point the patient passed through a very severe attack of pelvic peritonitis associated with pain, lower abdominal tenderness, retention of urine requiring the catheter, proctitis, rapid pulse, and high fever. The attack lasted from two to three weeks. During that time the uterine hæmorrhage gradually ceased, and was replaced by a white discharge. On April 23, nearly a month after the operation, she began to have slight uterine hæmorrhage. This was regarded as her menstrual period. On April 26, she was allowed to get up for the first time. On the following day she vomited several times, and the temperature began to rise. From that date until May 5, she vomited several times each day, and the temperature rose steadily until it reached 105° with an accompanying pulse rate of 136 per minute. During this feverish attack, there was no pain and the patient did not look seriously ill. On May 2, she had a serious rigor followed by fever and profuse sweating. On that day I examined her. She was perspiring freely, the tongue was clean and the abdomen was normal, except for slight tenderness on deep palpation into the pelvis. On vaginal examination, the cervix was all but closed, the uterus was enlarged, admitting the sound 3 inches, anteverted and freely movable. At the bottom of Douglas's pouch, a tranverse thickening could be felt. There was slight fulness in the region of the right broad ligament, but little or no tenderness was discovered. From the cervix a little brown discharge was flowing. Rectal examination revealed nothing further.

On May 3, the temperature rose to 104°, pulse 148 per minute; there was no rigor, but the vomiting and vaginal discharge continued. On May 4, I was asked to deal with the case. On examination the same physical signs were elicited as on May 2. She had one rigor at midday. The uterine discharge was examined bacteriologically and was found to contain streptococci and bacilli. She was promptly injected with 20 c.c. of antistreptococcic serum. She had another rigor in the evening.

On May 5, she had a rigor in the early morning, and a second injection of antistreptococcic serum. I determined, however, to wait no longer, but to explore the uterine cavity, the induration behind the uterus and the thickening in the right broad ligament. I thought that the temperature and successive rigors, with almost complete absence of physical signs or pain, were best explained by some septic phlebitis of the right pampiniform plexus. If I could not discover any satisfactory evidence to account for her symptoms, I was fully determined to do a hysterectomy. The patient was put under an anæsthetic at 2 p.m. The thickening in the right broad ligament and the induration behind the uterus were now more clearly palpable. The cervix having been dilated up to No. 18 Hegar, the finger was passed into the uterine cavity, the lining membrane was everywhere soft and smooth. At a point immediately below the opening of the right fallopian tube, the finger could be passed through a perforation in the uterine wall into the middle of the mass in the right broad ligament. The contents of this mass appeared to be soft and friable. A blunt lithotomy scoop was directed up through the cervix, and the perforation in the uterine wall. In this way the contents of the broad ligament enlargement were removed, and were found to consist of a dark grey dry mould-like material, which had a most putrid odour. In emptying the collection, there was an entire absence of hæmorrhage, and, after it was completely evacuated, the peritoneal lining of each layer of the broad ligament could be felt intact. I regarded this collection as old putrid blood clot, situated within the right broad ligament, and caused by a perforation in the uterine wall inflicted by the sharp currette used at the first operation. I packed the broad ligament cavity with iodoform gauze wrung out in 2 per cent. formalin solution through the cervix and perforated uterine wall. An incision was then made into the thickening in the posterior vaginal fornix. This proved to be a localised abscess containing about 2 ounces of yellow pus. After completely evacuating it, the cavity was packed with iodoform gauze wrung out of formalin solution. I considered that sufficient had been found to account for her symptoms, and contented myself with these simple operative measures.

The gangrenous clot from the broad ligament gave a growth of streptococcus pyogenes, and a sporulating bacillus giving off a very putrid odour. The pus from the perimetric abscess gave a pure growth of streptococcus pyogenes.

The result of my efforts was rather remarkable. She had a slight rigor at 4.30 p.m. on the same day. The retching ceased entirely three hours after operation, the temperature fell the same evening to 97° and the pulse to 100 per minute. Except for a slight rise of temperature on the day following operation, her symptoms entirely disappeared, the temperature kept steadily along the normal line, and the pulse fell to about 80 per minute; there were no more rigors, profuse sweating or vomiting, the vaginal discharge ceased in ten days, and the patient appeared to make excellent progress constitutionally. There was practically no interruption in her recovery until March 10th, when she got up for three hours. On the two following days she complained of aching pains throughout her body, associated with a temperature of 100° and a papular rash over the entire skin. The nature of this mild attack, which passed off entirely in two days, was not perfectly understood. She got up as usual on the 22nd, without any ill-effects and left hospital on May 24, without any uterine symptom or physical sign beyond a slight enlargement of the uterine body. She was instructed to report herself at the end of a month.

It was the end of June, when I next had the opportunity of examining her. She had not suffered from any pain, but there had been during the past fortnight a little brown discharge from the vagina. On examining her, the uterus was still enlarged, and there was once again a small soft swelling in the right broad ligament in exactly the old situation. I thought it was another hæmatoma, and I recommended her to come in and have a hysterectomy done. I left for my summer holiday on the following day, having taken her name and address for early admission. I next saw Mrs. S. early in August; she had not been admitted. Since my last interview, there had been several regular losses of blood from the vagina, there was still an entire absence of pain, but she had obviously lost weight. The broad ligament mass was now the size of a small orange and intimately fixed to the uterus. Having

charge of all the beds, I admitted her without delay. She came into hospital on August 14, having lost one stone in weight since her discharge on May 24. Abdominally, a firm, well-defined tumour could be felt rising out of the right half of the pelvis and reaching half-way to the umbilicus. It was free from tenderness and was moderately movable. There was no evidence of peritoneal fluid, and the liver was not enlarged. Bimanually, the uterus could be felt pushed towards the left and anteverted. Adherent to its right side was the soft elastic mass which could be palpated abdominally. The uterus and the mass appeared to move together, there was an entire absence of tenderness on manipulation. The appendages could not be palpated apart from the tumour. The sound passed into the uterus a distance of 3 inches, and there was present a little brownish vaginal discharge. Beyond some harshness and slight prolongation of expiration, the lungs appeared to be normal, the heart sounds were pure but feeble, the temperature was 99°, and the pulse 80 per minute. There was no urinary trouble and the bowels were quite regular. Her appetite was good, and there was no nausea or vomiting.

Operation, August 15th.—After opening the abdomen, a large irregular mass was encountered rising out of the right half of the pelvis and apparently originating in the right half of the uterine body. It was maroon-coloured, and I had very little doubt that the condition was that of chorio-epithelioma. Several coils of small intestines were gently detached from its surface, the raw places produced bleeding very freely. It was then ascertained that the growth was intimately adherent to the cæcum and lower end of the ilium, and its complete removal was so evidently impossible that nothing further was attempted. A small piece, however, was removed for microscopical examination. The already stripped areas bled so freely that the surfaces had to be compressed with strips of gauze packing. The abdominal wound was closed except at the point where the packing emerged. She recovered from her operation, and for nearly three weeks took her nourishment splendidly. There was little or no hæmorrhage, and the abdominal wound practically healed up. There was an entire absence of pain, even to the last. She nevertheless

rapidly lost flesh and became weaker almost daily. Towards the end, her temperature began to rise to 103·5°, with an accompanying pulse rate of 150 per minute. She died on September 3, exactly three weeks after her third operation.

A microscopical examination of the piece removed during operation confirmed the diagnosis of chorio-epithelioma.

Autopsy.—The following is a brief abstract of the post-mortem appearances. There was a little blood-stained fluid in both pleural cavities. The lungs showed numerous nodules of secondary growth, chiefly arranged on their surfaces. The nodules were raised above the lung surface, and varied in size from a pea to a walnut. The right lung contained more growths than the left. On section, the lungs showed the same growths scattered throughout their substance, and the nodules were typical of syncytioma malignum. There were no enlarged glands in the thorax. The peritoneum was free from fluid and showed no secondary deposits. The mesenteric, lumbar and iliac lymphatic glands were carefully examined, but showed no change. The liver, spleen, kidneys and other abdominal viscera showed no trace of metastases. The primary growth was situated in the right uterine horn. It was rounded and nodular on the surface. In virtue of its position, the uterus was asymmetrical; this is best illustrated by the following measurements:—From the os externum to the uterine end of the right Fallopian tube the distance was 12·5 c.m., from the os externum to the uterine end of the left Fallopian tube the distance was 7 c.m. The growth was confined to the right postero-lateral aspect of the uterus, and it bulged into the right broad ligament. The Fallopian tubes on each side were thickened, the ovaries were plastered down with their corresponding tubes to the lateral aspect of the growth. There was little or no enlargement of either ovary, and no evidence of dropsical graafian follicles. The round ligaments were as thick as cedar pencils. Densely adherent to the apex of the growth were the lower ends of the ilium, the cæcum and the appendix. The latter was flattened, and its wall was thinned out like wafer paper. No viscus was actually perforated by the growth, the vagina was entirely free from disease. The bladder, rectum, and ureters all escaped invasion, there was no thrombosis of the pelvic veins

PLATE VIII.

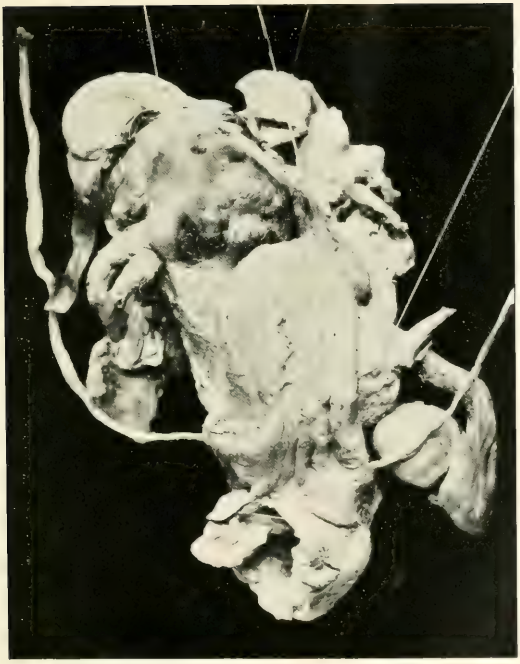

Fig 1. *Front view of Specimen.*

PLATE IX.

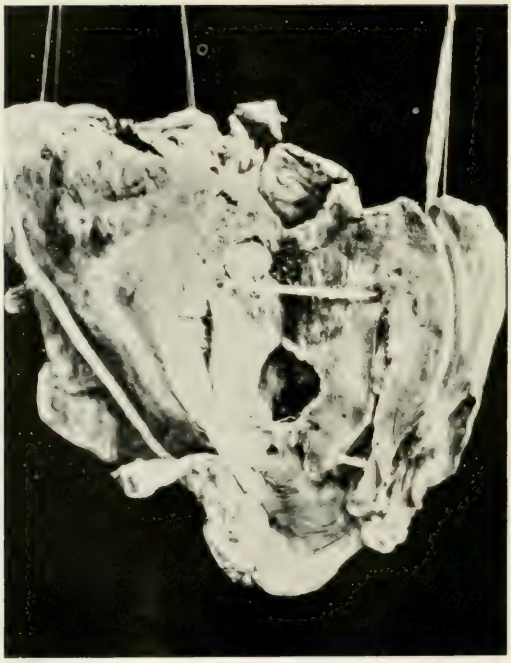

Fig. 2. *Uterine cavity laid open, showing the growth entirely in the muscular tissue.*

(*see* Fig. 1). When the uterus was sectioned, it was found that the uterine cavity was 3 inches long, had a perfectly smooth lining, and was entirely free from growth (*see* Fig. 2). In the right cornu was a small perforation passing into the middle of the growth, which consisted largely of brokendown blood clot.

On microscopical examination, it was found that the tumour was a syncytioma malignum showing the usual syncytial and Langham's cells scattered irregularly in an atypical manner. Many of the blood vessels of the tumour were filled with these cells. The great bulk of the tumour consisted of brokendown blood clot. The right round ligament was invaded by growth for fully an inch from its uterine end. The Fallopian tubes, ovaries, and appendix were all sectioned, but showed no involvement by growth. Several enlarged lumbar, iliac, and mesenteric glands were examined with a negative result.

Résumé.

February, 1904.—Last full-time child.

December, 1904.—Began with uterine hæmorrhage daily.

March, 1905.—Polypus removed, curetted. Pelvic peritonitis followed. Rigors, tumour in right broad ligament.

May 5, 1905.—Second operation, uterus found perforated, broad ligament hæmatoma evacuated, and small perimetritic abscess opened.

May 24, 1905.—Discharged apparently cured.

July 5, 1905.—Slight metrorrhagia, small mass size of a tangerine orange in the right broad ligament.

August 14, 1905.—Tumour the size of a large orange.

August 15, 1905.—Third operation, inoperable, chorio-epithelioma.

September 3, 1905.—Death.

September 4, 1905.—Autopsy. Large chorio-epithelioma of right uterine wall, multiple secondary deposits in both lungs.

Remarks.

Since Sanger published the first two cases of deciduoma malignum in 1888, a considerable number has been recorded by others. In the year 1904, three cases of syncytioma

malignum were brought before the annual meeting of the British Medical Association by three of my fellow gynæcologists in this city, namely, by Dr. Thomas Wilson, Dr. Martin, and Dr. Savage. It is probably reasonable to assume that something like one case of this comparatively rare form of malignant disease occurs in a centre like Birmingham during each year. It is, however, more than likely that the real nature of this malady is often overlooked, and that the subsequent course of such is ascribed to malignant adenoma of maternal origin.

In taking a retrospect of the case just described, although the patient came under my care when the growth had been partially removed by curettage, and the condition was complicated by sepsis, I cannot help feeling that, by the exercise of more thorough method of investigation, coupled with a little more imagination, this brave woman might have been rescued from her fate.

For eleven months after the birth of her last child, she menstruated regularly. It is important to bear this long period of normal health in mind in deciding the probable origin of the new growth. MacKenna has ascertained that the average time between labour and the first appearance of any evidence of chorio-epithelioma is ten weeks, but that, in rare cases, one or more years may elapse. In the case before us, there are two distinct possibilities which might explain the origin of the syncytial proliferation. The first is that it arose in chorionic elements which had been left in the uterus from her previous pregnancy, and which had lain dormant for a time before taking on malignant characters. The second, and to my mind the more likely explanation, is that Mrs. S. became pregnant in November, that the cells of the trophoblast became epitheliomatous within a few weeks and led to an abortion in December. The profuse metrorrhagia following was partly the result of abortion and partly the result of chorio-epithelioma. Which of these explanations is correct, it is impossible to determine.

The first lesson of this case has reference to the question of metrorrhagia following pregnancy, or abortion. This woman had been under special hospital treatment for three or four months. The condition was regarded as one of miscarriage.

Her blood became slowly impoverished, and her uterus a prolific factory of septic products. The question is for how long are we justified in allowing cases of post-partum, or post-abortum hæmorrhage to continue before dilatation and emptying of the uterus becomes imperative? Severe and repeated hæmorrhage, or grave septic invasion, must call for prompt treatment at all times. If, however, neither of these complications exists after miscarriage, but only a slight blood-stained discharge, I still think that such cases should not be allowed to drag along indefinitely, on the supposition that the uterus will eventually empty itself. Although severe hæmorrhage may be a very unlikely complication in these circumstances, there remain two risks, one common and the other rare, which early operation would obviate. The common risk is mild endometritis, which may lead to more serious sequelæ, such as salpingitis or peritonitis, or may simply leave the patient sterile for life. The rare risk is the invasion of maternal tissue by a perverted trophoblast to form this elusive neoplasm syncytioma malignum. My own feeling is that no woman should be allowed to suffer from metrorrhagia for more than one month without something being done to ascertain its real cause.

The second lesson of this case is that curetting of a uterus, which is the seat of irregular hæmorrhage, though a simple operation in itself, carries with it a responsibility of considerable importance. The first man on the field has the best chance of correctly interpreting the physical conditions revealed by exploration. Whether the subsequent course of this case would have been different had either Dr. Wilson or I been present at the first operation, I do not know. When the cervix was dilated up, the uterine cavity could have been freely explored by the finger, and it would have been of the utmost importance to have determined where the polypus arose, and what was the character of its basal attachment and surroundings. That there was some friability and destruction of the uterine wall is proved by the subsequent perforation due to the sharp curette.

The third lesson to be learned has reference to the danger of the sharp curette in certain conditions of the uterine body. The parturient uterus is peculiarly soft and friable,

especially in some women. This is especially the case after abortion complicated by sepsis. Wherever sepsis exists in the uterus, whether in conjunction with pregnancy or with polypi, the sharp curette is contraindicated, because it removes a layer of fibrin or granulation tissue which is nature's barrier to septic absorption. In its place is established a raw absorbing surface, which allows the organisms and toxins of a previously infected cavity a free access to the lymphatics and blood vessels of the pelvis. We were, therefore, not surprised when this patient developed an acute pelvic peritonitis after her first operation.

The fourth and most vital error of all was the omission to preserve the curettings for microscopical examination. Had either Dr. Wilson or I been present, this would unquestionably have been done, as we make it a rule in our department to preserve all uterine curettings for histological investigations. The polypus was inadvertently thrown away before either of us had an opportunity of seeing it. I am confident that it is of vital importance to histologically investigate all curettings from cases of metrorrhagia of doubtful origin. I have known several cases of malignant disease, in which practitioners have curetted the uterus, thinking that the condition was one of endometritis, and, as the metrorrhagia continued in each case, they were sent into hospital only to be returned as inoperable cases of carcinoma. If the curetting had been preserved and sent to a skilled pathologist, months of valuable time would have been gained, and the lives of one or more of the patients might have been saved thereby. I would lay special stress upon the importance of an expert and experienced pathological opinion, because it is by no means easy to distinguish normal decidual tissue, simple chorionic remains, or the syncytial overgrowth of hydatiform degeneration from the proliferation of syncytial and Langhan's cells seen in syncytioma malignum. Carcinoma and sarcoma are usually easy to distinguish from it, but when giant cells and a degenerate stroma are present in either of the former, the distinction becomes much more difficult. Syncytioma usually occurs before the age of thirty, whereas cancer usually occurs after the age of forty. The frequency of chorio-epithelioma after hydatic mole is well known, and Findley has

laid down the rule that the uterus should be curetted two weeks after the mole is expelled and the curettings carefully examined, and, further, if at any time during the next three years metrorrhagia sets in, that this must be repeated. I would apply that care to abortion and labour, and say that, if after one month any irregular discharge is present, the uterine cavity should be explored carefully with the finger, and the endometrium curetted and microscoped. If this routine were systematically adopted, I feel confident that our results in this highly lethal disease of chorio-epithelioma would become very different indeed.

The patient recovered from her pelvic peritonitis and continued to make satisfactory progress for one month, when metrorrhagia and rigors set in. At this point the case came under my care. The symptoms and physical signs suggested septic infection, either of the nature of a small localised abscess, or phlebitis of uterine origin. The uterine discharge was laden with streptococci and sporulating bacilli. Antistreptococcic serum had no effect whatever, and, from what we know of the different strains of streptococci, this result was not surprising.

I explored the uterus without delay, yet in so doing I completely missed the essential nature of the disease. How did this misfortune take place ? In the first place, the uterine mucosa was perfectly smooth. Marchand has drawn attention to the marvellous rapidity with which the uterine cavity is again filled up after curetting in syncytioma malignum ; it may become filled up even in a week. There was an entire absence of such intra-uterine recurrence in this case even up to the last. In the second place, the small hole leading through the uterine wall into the right broad ligament did not arouse my suspicions because of the soft normal consistence of the surrounding muscular tissue, and because I knew that a sharp curette had been used. The fact that it had not healed up in one month did not weigh heavily with me on account of the septic nature of the uterus. I have known of other perforations in the uterine wall of traumatic origin which took a still longer time to heal. The gangrenous, dry, mould-like contents of the right broad ligament did not suggest to my mind chorio-epitheliomatous tissue. I regarded it as an old hæmatoma

resulting from the perforation which had become septic, and which was slowly discharging through the hole into the interior of the uterus. This interpretation seemed to be confirmed by the entire absence of bleeding during the evacuation of the septic hæmatoma. It is quite easy to realise now how perfectly the history and clinical facts fit in with the course of syncytioma malignum that had been overlooked. I was probably too ready to blame the curette for the perforation, and the fœtid odour of the hæmatoma created an atmosphere, which, whilst causing septic infection to loom large in my imagination and reasoning, at the same time masked the symptoms and signs of malignant growth.

Films were made and stained of the hæmatoma contents, and showed plentiful organisms, but no syncytial cells.

The results of my simple operative measure were truly remarkable. The rigors and vomiting ceased, the temperature immediately dropped to normal, and the metrorrhagia rapidly disappeared. I felt that the offending spot had been removed, the essential spot, in this case accounting for the fever and rigors, probably being the fœtid broad ligament collection rather than the small abscess. The frequency with which rigors and temperatures occur in chorio-epithelioma is almost certainly due to the supervention of sepsis. Chorionic tissue and blood-clot form a suitable nidus for bacterial growth, just as they do in incomplete abortion and retained products after parturition. The toxins, produced by the bacteria, become readily absorbed into the general circulation by the opened-up blood vessels of the syncytial growth. After leaving hospital the patient returned in a month looking well, but with a history of slight metrorrhagia within the last week. There was a return of the small boggy mass in the right broad ligament. Then it was that I thought of the possibility of chorio-epithelioma for the first time. Unfortunately, I left for my summer holiday within a few days of seeing her, although I put down her name and address for early admission before leaving. On my return she had not been admitted, and thus further delay occurred. I scarcely think, however, that operation at this stage would have eradicated the disease. I arrive at this conclusion partly because of the length of time she had already suffered from it, namely, seven months, and partly by the numerous

metastatic deposits found at death, which took place within two months of this date. The average length of syncytioma malignum from its first symptoms up to death is six months.

To sum up, I would say that the history of this case brings out the following points :—

1. Metrorrhagia, following abortion or labour, should call or more prompt investigation, especially in women under thirty.

2. Dilatation and curetting, in such circumstances, is an operation of considerable responsibility, in view of the possibility of malignant disease.

3. Sharp curettes are contraindicated in the parturient uterus, and where septic infections exist.

4. All such curettings should be submitted to an expert pathologist for microscopical examination.

5. Continued metrorrhagia, after such treatment, should be regarded as of serious import, and should call for fresh investigation and prompt radical measures.

TWO CASES OF BRANCHIAL FISTULA.

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[With Plates X.—XI.]

Cases of branchial fistula are sufficiently rare as to warrant the publication of the two following cases. They were shown by me at the Pathological and Clinical Society of Glasgow on two occasions: (1) on 13th March, 1905, immediately prior to operation, and (2) on 9th October, 1905, seven months after the walls of the fistulæ had been dissected out.

The first case was a girl, aged 25, engaged in a weaving factory, who, in October, 1901, was admitted to the Western Infirmary under my care, with a swelling in the neck, from which a yellow discharge made its way into the mouth.

The history she gave was that two years before that time, when 19 years of age, she began to feel an itching sensation in the neighbourhood of the right tonsil. This continued, and was constantly present, for six months, when it suddenly ceased on the appearance of a yellow discharge in the mouth. At first this discharge made its appearance at intervals of from 7 to 10 days, and in amount she thought it would be about two teaspoonfuls on each occasion. The intervals between the time of its appearance gradually became shorter, and the amount of discharge greater, until latterly, when it appeared about every third day, and would measure about half a wine-glassful on each occasion. Sometimes the escape of the discharge was preceded by a choking sensation, and for some hours after the flow of pus had ceased, she expectorated blood-stained mucus. In early life she was very anæmic, suffering from shortness of breath, palpitation, etc. but latterly she had been robust and well, and had been able to attend to her work with regularity. There was no history of injury, and there was no apparent association between menstruation, which was regular, and the appearance of the discharge in the throat.

On examination a rounded swelling was seen in the neck, the lower border of which was about one inch above the right sterno-clavicular articulation close to the inner border of the sterno-mastoid muscle. The swelling was seen to rise with the larynx during the act of deglutition. From this swelling there could be traced a firm, fibrous-like band passing upwards in the direction of the great cornu of the hyoid bone on the right side. In its whole length this "tube" measured 5 inches. When pressure was exerted over the swelling its contents were forced upwards, and, with the patient's mouth held widely open, the cream-like fluid was seen to escape into the fauces through an opening situated between the tonsil and the posterior pillar on the right side.

The discharge was examined by Professor A. R. Ferguson, who reported that "there were traces of mucin through the film, and that the cells present consisted largely of polymorphonuclear leucocytes. Desquamated epithelial cells were present, sometimes in clusters, and occasionally showing nuclear division, probably the result of purulent infection of the epithelium-lined canal."

The culture made consisted of "a mixture of diplococci varying in size, one of the largest being recognised as commonly met with about the fauces and tonsils, while another was not unlike the pneumococcus. Very few groups of definite pyogenic cocci were found, and the occasional clumps of bacilli seen belonged to non-pathogenic species."

In October, 1901, I made an incision over the swelling, and extended it upwards in the line of the cord-like structure through which the firm fibrous cyst-wall was removed, along with fully 2 inches of the efferent tube. The interior of the portion of the tube which was left was scraped by means of a sharp spoon, and the cavity was packed with iodoform gauze in the hope that its lumen might be obliterated by inflammatory action.

The wound healed satisfactorily, and for two years there was an entire absence of discharge. Two years later, however, it again began to appear; at first in small quantity, but by March last, when the patient was before the Society for the first time, some creamy discharge could be expelled at almost any time by making firm pressure on the right side

of the neck, midway between the sterno-clavicular joint and the angle of the lower jaw.

The second patient was a man, aged 26, a brickmaker by occupation. He was referred to me at the Western Infirmary in February, 1905, on account of a swelling on the right side of the neck which, on examination, was seen to occupy a position almost identical with that in the former case, but with its lower border half an inch only above the centre of the sterno-clavicular articulation.

He was said to have had, as a child, a reddish spot just above and to the right of the sterno-clavicular joint. His parents noticed, even in his early childhood, that a "tough cord" could be felt beneath the skin extending from near the sterno-clavicular articulation upwards to the upper border of the windpipe.

This condition continued, giving rise to no discomfort, till the spring of 1903, when the spot, without any apparent cause, increased in size, suddenly burst externally, and discharged a few drops of thick yellow fluid. Since that time the lower portion slowly swelled for a time, then burst, this occurring almost regularly once a fortnight. The fluid discharged on each occasion was stated to have been in quantity about one teaspoonful. The swelling was unaccompanied by pain, and no discharge had ever been observed to appear in the buccal cavity.

On examining the neck, a swelling was seen immediately above the right sterno-clavicular articulation. Its surface was discoloured, its edges were hard, and there was a very small opening near its lower border. From this external fistulous opening a thick, firm, cord-like band could be traced upwards to a point midway between the right thyroid cartilage and the hyoid bone, where its identity was lost, and to this point it measured 4½ inches. On a careful examination of the mouth and fauces, a fistulous opening was found close to the posterior border of the right tonsil. This resembled the mouth of a crypt, but a probe could be passed readily into it in a downward direction for a distance of 2 inches. No secretion, however, could be pressed upwards into the mouth through that fistulous opening, but fluid resembling muco-pus could be expelled by pressure from the opening in the neck.

PLATE X.

FIG. 1. *Twelve months after operation with fistula closed throughout its whole length. Scar indicates the line of incision.*

Fig. 2. *Immediately before operation, March* 1905. *The external fistulous opening situated immediately over the right sterno-clavicular articulation is well shown.*

Fig. 3. *Twelve months after operation, March* 1906. *Fistula closed throughout its whole length. Scar indicates the line of incision.*

As has been stated, the two cases were shown at the Glasgow Pathological and Clinical Society on the 13th of March, 1905, and within three days of that date I had operated on both. Chloroform was used in each instance.

In the former case an incision was made, extending from the great cornu of the hyoid bone on the right side down to the scar marking the site of the former operation-wound, and following the line of the anterior border of the sterno-mastoid muscle. At its lower extremity the walls of the fistula were firmly bound to the skin as a result of the operation performed in 1901; but, by a careful dissection through the incision described, the firm, fibrous walls of the fistula were separated from the various tissues to which they were adherent. This having been accomplished, I passed a probe through the fistula from the external opening upwards and into the pharynx. I then secured the lower end of the fistular wall—what was practically a tube—with a ligature which I attached to the probe, and by upward traction invaginated the tube, and carried it "outside-in," up to the pharynx. There it was removed, and the portion of tonsil with which the upper opening of the fistula was incorporated, was also clipped away. The wound in the neck was carefully closed with horse-hair and silkworm gut, and primary union followed.

A similar operation was performed in the case of the man. A long incision, in line with the anterior border of the sterno-mastoid muscle, extending from the external fistulous opening to the upper border of the thyroid cartilage, was made, through which the fibrous wall of the fistula was dissected out. It proved to be a less dense structure than that met with in the former case, and was thus more difficult to identify, particularly towards its upper extremity, but by the exercise of patience and the expenditure of some time it was wholly removed. The incision was closed as in the first case, and it also healed throughout by first intention.

In each case the result was in every respect most satisfactory, as was seen by the various members of the Society who examined the cases when exhibited seven months after operation; and, looking to the method adopted for the complete extirpation of the fistular walls, recurrence in either case is very improbable.

The tissues removed were handed to Dr. John H. Teacher of the Pathological Institute of the Western Infirmary, Glasgow, who examined them microscopically, and reported as follows:—

"1. *Internal incomplete fistula of the neck opening near the right tonsil.*—The cyst was received in a collapsed condition. A portion of the wall was removed and cut by the paraffin process. It consisted of a membrane of dense fibrous tissue about ·3 mm. thick, composed chiefly of lymphoid tissue and covered with stratified squamous epithelium like that lining the mouth. There were some small masses of tissue attached, which consisted of mucous glands, like the buccal glands, and from the direction of their ducts they would appear to have opened into the cyst."

2. "*Complete branchial fistula.*—This, as received, was a tubular mass about 9 cm. long, thicker (about 2 cm.) at its lower end, where there was a little piece of skin enclosing the orifice, and tubular (about ·5 cm. in diameter) and round above. It appeared to be open at the upper end, although the orifice there was very narrow.

It was lined with a mucous membrane about ·3 mm. thick, consisting principally of lymphoid tissue covered with columnar ciliated epithelium of the type found in the trachea. There were no glands. The fibrous wall was very dense and averaged 1 mm. in thickness."

Branchial fistulæ and branchial cysts result from the incomplete closure of a branchial cleft.

The branchial clefts are the spaces between the branchial arches, which latter are formed in the human embryo in the second or third week of intra-uterine life, and the clefts, as development proceeds, are in large part obliterated by the fusion of the neighbouring arches.

The Eustachian tube, the tympanic cavity, the external auditory meatus and the Glaserian fissure are formed by a normally unobliterated portion of the first cleft.

The other clefts are normally totally closed.

A branchial fistula is described by Rose and Carless as a narrow sinuous tract extending inwards from the skin, and perhaps communicating, but not necessarily so, with the pharynx. The external opening is usually situated along the

anterior border of the sterno-mastoid, and most commonly near its lower end, close to the episternal notch, the fistula then arising from the lowest cleft.

They are lined with epithelium and secrete a glairy or mucoid fluid.

They are not uncommonly associated with other abnormalities such as macrostoma, absence of pinna or accessory auricles situated either near the orifice of the fistula or close to the ear.

In the majority of cases they may be disregarded, but if they are troublesome they should be laid open, and the lining membrane either dissected away or destroyed with the galvano-cautery.

Branchial cysts like the fistulæ arise from incomplete closure of a branchial cleft, the unobliterated portion being distended with secretion.

They usually appear in adolescents between the ages of ten and twenty, and are frequently attributed to a blow, which, it may be presumed, brings into activity structures which would otherwise have remained passive. They increase slowly and painlessly, and their contents, if near the cutaneous end of the cleft, are sebaceous in character, similar to, but more fluid than that found in a dermoid cyst—flattened epithelial cells, cholestrine plates, and fatty granules. If placed nearer to the pharynx they are occupied by a glairy mucoid fluid. They are usually lined with squamous epithelium, but a few have been recorded in which the cells were columnar and even ciliated in character.

The most common situation is in the third cleft, the cyst then lying between the thyroid cartilage and the anterior border of the sterno-mastoid.

Tillman describes congenital branchial fistulæ as being divided into lateral and median fistulæ.

Lateral branchial fistulæ of the neck may form a complete abnormal canal, with an external and an internal orifice. The latter always opens into the pharynx, and the position of the external opening is variable, but most frequently occurs in the region of the fourth branchial cleft, near the sterno-clavicular articulation.

They are further divided into incomplete external, which

have only an outer opening, and incomplete internal, in which there is only an inner opening.

The orifice of the complete and of the incomplete internal fistulæ in the pharynx is usually in its lower part, or in the posterior palatine arch near the tonsil.

Of the two cases shown by me, the former was a typical example of the incomplete internal variety, due to incomplete closure of the fourth branchial cleft. Its orifice was situated in the right posterior palatine arch, and its lining membrane consisted of stratified squamous epithelium.

The second was an example of the same, becoming, after rupture at its lower extremity, a complete branchial fistula, with the external opening immediately above the right sterno-clavicular articulation, and in close association with the inner border of the sterno-mastoid muscle, and its inner opening in the right posterior palatine arch. In this case the lining membrane was of columnar ciliated epithelium.

In both cases the discharge was somewhat similar. In neither case was the presence of the fistula associated with other malformations. In the case of the girl, she was unaware of any abnormality until she was 19 years of age, whereas in the man, his parents were aware of the existence of a spot and a firm cord-like band in his neck in early childhood; but these remained quiescent until he was 24 years of age, when, without any known cause, a swelling occurred at the site of the spot, which burst, and continued to discharge at intervals.

In neither case was there anything resembling fœtal structures found in the cavities.

A REVIEW OF RECENT WORK IN ABDOMINAL SURGERY.

By B. G. A. MOYNIHAN, M.S., F.R.C.S.,
and
H. UPCOTT, F.R.C.S.

TUBERCULOUS PERITONITIS.

SCHÖMAN (*Cent. f. Chir. XXXL., No.* 49, *Journ. Amer. Med. Assoc.*, 1905, Vol. I.), in spite of the gratifying results of laparotomy for this condition, has given it up in favour of puncture and slow withdrawal of the fluid, followed by the injection of iodoform emulsion, repeated in four to eight days.

According to the Mayos (*Journal Amer. Assoc.*, 1905, Vol. I.), tuberculous peritonitis usually has its origin either in the intestinal tract or in the female generative organs.

Tuberculosis of the intestines occurs in three forms; (1) multiple ulcers due to sputum inoculation in phthisical patients; (2) single, or at most, a few, ulcers generally in the ileum, which have a marked tendency to heal with stricture formation; (3) conglomerate masses about the cæcum, giving rise to tumour, and having the macroscopic appearances of carcinoma. The last two forms are often, if not usually, primary, and are due to accidental inoculation. The Mayos have found a localised tuberculous process in the appendix 29 times, the disease often invading the lymph glands. Out of 21 cases of localised intestinal tuberculosis occurring in 184 cases of intraperitoneal tubercle, 13 were found to be primary, and 8 of uncertain origin. Tuberculosis of the peritoneum is considerably more common in women than in men (about four to one, in the Mayos operative experience), while of the women affected, the great majority have a primary focus of infection in the Fallopian tubes.

The relationship of the tubal disease to peritoneal tuberculosis is well shown by the study of 16 cases operated upon during the first three months of 1905. Eleven were women, in nine of whom the origin was in tuberculous tubes, one in the appendix, and one unlocated; five were men, three with tuberculosis of the appendix and cæcum, and two unlocated.

Many cases of tuberculous ascites treated by simple laparotomy, though temporarily cured, have later returned with a relapse of the condition, some of them four or five times. In several cases of women, temporarily cured by laparotomy, vaginal examination revealed the presence of masses in the region of the appendages which were not previously palpable.

Following this hint, as to the cause of re-infection of the peritoneum, the Mayos removed the uterus and tubes in several cases of tuberculous peritonitis, but on examination of the parts removed they found that the tubes alone were responsible for the continuation of the disease, the commonest pathological lesion being a lupus of the tubal mucous membrane.

In a minority of patients, with no tubal disease, a chronic appendicitis with enlarged glands in its mesentery has been found, and in these cases the peritoneal nodules are thickest in the appendix region, just as in the pelvic cases the neighbouring peritoneum shows the greatest involvement.

From these experiences, the Mayos conclude that simple laparotomy in tuberculous peritonitis is not sufficient. The primary focus of disease should be sought for, and, if possible, removed, for by this means relapse may be prevented.

Out of 26 radical tubal operations they have had 25 recoveries, 7 of these having been previously treated by simple laparotomy. So far, not one of these 25 has needed further operation.

The results of the radical operation upon the tubes have been better than those where the appendix has been the primary focus; possibly because the fibro-plastic form of tuberculous peritonitis is relatively more common in the latter case, whereas tuberculous salpingitis is more likely to give rise to ascites.

Goschel's experience (*Deutsch. Arch. f. klin. Med.* LXXXIV Nos. 1 to 4; *Journ. Amer. Med. Assoc.* 1905, Vol. II.) goes to show that about 23 per cent. of the cases with exudation, and 10 per cent. of the cases with adhesions, are permanently cured by operation. His final conclusions are, that laparotomy always helps, sometimes cures, and never harms.

Marcy (*Ann. of Surg.*, 1905, Vol. II.) is not content with simple laparotomy, but, after drying the cavity, sponges with a 1–1000 solution of bichloride of mercury, then washes

with saline, dries, and finally blows iodoform powder over the organs.

Cooper (*Journ. Amer. Med. Assoc.*, December 1905, p. 1978; *Annals of Surg.*, March 1906) states that of the many causes which may give rise to structures resembling true tubercles, the most important in the peritoneal cavity are animal parasites and foreign bodies. He reports the case of a woman whose abdomen, six weeks after the perforation of a gastric ulcer, was distended with fluid. At operation, the intestines were seen to be studded with miliary tubercles. At the autopsy, however, microscopical examination showed that the peritoneal nodules contained no bacilli, but did contain small food particles that had evidently escaped from the stomach through the perforated ulcer.

Abbott (*Surg. Gyn. and Obst.*, March 1906, p. 339) quotes 12 cases of tuberculous peritonitis with ascites, in which, after emptying the abdomen of fluid, he closed the wound and then inserted a canula, through which the abdomen was filled with pure oxygen. The canula was then withdrawn and the abdomen closed entirely. All these patients made perfect recoveries without any recurrence.

The following are some of the conclusions arrived at by Lawrence (*Surg. Gyn. and Obst.*, November 1905, p. 443). In the large majority of cases the condition is primarily visceral, and the peritoneum is secondarily involved. The primary focus should always be removed. When the mesenteric glands are involved, operation does little good.

Liver and Bile Tracts.—Maylard (*Annals of Surgery*, 1905, Vol. I.) records the case of a man suffering from chronic obstructive jaundice, which he attempted to relieve by performing hepato-cholangio-jejunostomy. The abdomen was opened by a transverse incision, which revealed extreme matting around the pylorus and duodenum, so much so that these parts could not be identified. A loop of jejunum was stitched to the margin of the liver for a distance of 2 inches. An incision $1\frac{1}{2}$ inches long was then made into each viscus in front of the line of suture, and the opposing surfaces beyond the two cuts united by interrupted stitches. There was practically no change in his general condition, and he died about two months later.

Mayo (*Annals of Surgery*, 1905, Vol. II.) records seven cases of operative defect of the common bile duct. The experience gained from these cases has led him to form the following conclusions:—(1) The common duct may be united end to end by through and through catgut sutures. Supporting sutures in the surrounding tissues are essential, and a portion of the line of union should be left open for drainage. (2) The common or hepatic ducts may be implanted into the duodenum provided a peritoneal covered portion of the intestine is chosen. (3) The second portion of the duodenum should be loosened, drawn to the right, and fixed by sutures, in order to prevent tension on the anastomosis. (4) Drainage, if necessary, should be pliable, covered with rubber tissue, and should not be placed in contact with the suture line.

Colodelaterpexy.—Under this name Wyllys Andrews (*Surg. Gyn. and Obst.*, October, 1905) describes an operation destined to avoid the troublesome sequelæ of operations on the biliary tract, due to adhesions between the gall-bladder and pyloric region of the stomach. The scheme of the operation is the substitution of the colon for perigastric adhesions. The technique consists in separating the adhesions to the stomach, then, by means of three or more catgut sutures, the right end of the transverse colon is approximated to the margin of the right lobe of the liver. He reports five cases in which this operation was performed; all obtained marked benefit. In such cases Andrews considers his operation preferable to gastro-enterostomy.

Operative Treatment of Cirrhosis with Ascites.—Monprofit (*Trait. Chir. de la cirrhose du foie*, 1904), of Angers, has collected 224 cases in which surgical treatment was adopted for this condition. Of 213, in which the results are known, there is an operative mortality of about 20 per cent. Of those cases recovering from operation, 25 per cent. died subsequently from cachexia, or other concomitant diseases, while about 40 per cent. were cured, the remainder showing either partial or temporary improvement.

Cignozzi's compilation (*Reform. Medica*, XXI., Nos. 6 and 7; *Journ. Amer. Med. Assoc.*, 1905 Vol. I.) of 224 cases shows 46 per cent. cures or improvements, and a total mortality of 42 per cent.

Kozlovski (*Russky*, Vratch III., No. 5 ; *Journ. Amer. Med. Assoc.*, 1905, Vol. I.) tabulates 168 cases, of which 46 per cent. were improved (this list is apparently made up of the recoveries from operation in the two preceding series).

The indication for operation according to Monprofit is the commencement of ascites; he recommends that operation should be undertaken before tapping has been resorted to. Atrophic cirrhosis is the form generally admitted to be least influenced by medical treatment, he therefore particularly advises operation when atrophic cirrhosis is established, although the results are not so good at this advanced stage.

Alexandre has shown that omentopexy gives better results in the hypertrophic than in the atrophic stage of cirrhosis.

White states that epiplorrhaphy can not only cure ascites, but can also bring about a partial regeneration of the diseased liver-cells.

According to Cignozzi, in ascites due to thrombotic or phlebitic processes, or where the obstruction is due to compression from without, operation may effect a radical cure. In alcoholic cirrhosis the mortality is high and successes few, but the condition is so discouraging that a trial is justified. Hypertrophic cirrhosis is more favourable. Kozlovsky's table shows that of 51 cases in which the liver was enlarged, over 50 per cent. were cured or improved ; of 69 with atrophy, over 42 per cent. were improved ; while in 48 with a normal-sized liver, over 47 per cent. showed improvement.

As regards the particular method of operative procedure, Talma's operation takes precedence. Monprofit shows that the method of Schiassi possesses no advantages over the simpler procedure of Talma.

Porto-caval anastomosis, or Eck's fistula, is condemned by Vidal. Peritoneal friction (Grattage) alone, Monprofit considers useless, while hepatopexy, the original method of Rolleston and Turner, is practically abandoned.

Fowler (*Brooklyn Med. Journ.*, May 1905 ; *Journ. Amer. Med. Assoc.* 1905, Vol. I.) recommends tapping the abdomen some hours before operation through a free median incision, he then thoroughly dries the peritoneal cavity by rough sponging, and scrapes the upper surface of the liver and the peritoneal surface of the diaphragm with a scalpel. The

round ligament is shortened by pleating and fastened to the parietal peritoneum, and the edge of the liver is also sutured to the parietes. Finally, he fixes the great omentum to the anterior abdominal wall by interrupted sutures, commencing on each side as far away from the incision as possible.

Schiassi (*Gazetta degli Ospedali*, XXXVI., No. 46; *Journ. Amer. Med. Assoc.*, 1905, Vol. II.) says that early operation has every chance of success when the ascites is due exclusively to portal obstruction. When a patient with cirrhosis and ascites suffers from vague pains in the abdomen, rise of temperature, right pleural effusion and sensitive liver, and when the ascitic fluid contains a large proportion of albuminoids, and has the characters of an exudate, surgical intervention should be approached with care. In these cases of peritoneal inflammation, he advises waiting until the inflammation has passed into the chronic stage.

Maragliano (*Gazetta degli Ospendali*, XXVI., No. 103; *Journ. Amer. Med. Assoc.*, 1905, Vol. II.) reports the case of a man with cirrhosis and ascites, upon whom omentopexy was performed. The patient did well until the third day when symptoms of collapse appeared, and he died in a few hours. Autopsy revealed laceration of one of the veins in the omentum. Maragliano considers that this was due to the pulling of the stomach on the omentum in the efforts of vomiting. The case shows that it is advisable to fix the omentum high up, allowing plenty of slack.

Spleen.—Non-parasitic cysts of the spleen form the subject of an article by Powers (*Ann. of Sur.*, Vol. XLIII., p. 48). He adds a case of his own to 31 cases collected from the literature. The histories of these cases show that the tumour is generally of slow growth, and that, in a fair proportion, there is a history of antecedent trauma.

Out of the 32 cases, one died from rupture of the stomach before operation could take place, in two cases the spleen was removed for chronic hypertrophy, the cystic condition being discovered accidentally, and in one case the result of operation is not recorded. The treatment adopted in the remaining 28 cases was, puncture three, with two partial recoveries, and one in which no improvement followed; incision (and injection) two, both died; incision and drainage five, three

complete recoveries, one persistence of fistula, and one death; marsupialisation, three cases which recovered; resection of cyst, five cases, four recovered and one made a relative recovery; splenectomy, ten cases, all of which recovered. Looking at these results, the author considers splenectomy to be the operation of choice.

The majority of these cysts are large and unilocular, and contain blood or bloodstained serum; they probably originate in a subcapsular hæmorrhage.

Bryan (*Journ. Amer. Med. Assoc.*, September, 1905, p. 680) classifies cysts of the spleen as—

1. Dermoid cysts;
2. Simple; serous or blood cysts, and
3. Hydatid cysts.

The enlargement of the spleen in chronic malaria favours the development of cysts. Blood cysts are more common than simple serous cysts. Of 17 cases, seven had a history of malaria, and eight gave a history of trauma. He recommends splenectomy in those cases in which the spleen substance is so destroyed as to be useless, in other cases he advises suturing the sac to the abdominal wall, and draining.

Davis (*Journ. Amer. Med. Assoc.*, September, 1905, p. 684), from a scrutiny of the literature, puts the mortality of splenectomy for appropriate conditions at 15 to 18 per cent. He gives as the indications for splenectomy, cysts; benign tumours, tuberculosis and sarcoma; some cases of abscess of the spleen; traumatic rupture; splenic anæmia; some cases of malarial spleen; wandering spleen, which is usually due to previous hypertrophy, is preferably treated also by splenectomy. Splenectomy is contra-indicated in leukæmia, in amyloid spleen, splenic hypertrophy secondary to cirrhosis of the liver, secondary malignant disease, and the essential anæmias.

Pancreas.—Gregory Connell (*Ann of Surg.*, Vol. XLI., p. 724) describes a case of gunshot wound of the pancreas, and discusses 19 other cases collected from the literature. The author's case was a young man, who had been shot in the right side about the seventh costal cartilage by a ·32 cal. revolver. Beyond great pain and the vomiting of fresh blood, there were no marked symptoms. At the operation (three hours after the injury), perforating wounds of the right

lobe of the liver and of the stomach were found; they were sutured and the abdomen closed. Death occurred about 60 hours later. At the autopsy, the pancreas was found to be badly damaged in the track of the bullet, there was no peritonitis, but the stomach wounds showed no evidence of repair.

In the light of experiments undertaken by him, Connell concludes that the escape of pancreatic secretion into the peritoneal cavity does not cause peritonitis; and he suggests that this lack of destructive action may be due to the absence of enterokinase, though the digestion of the skin around a pancreatic fistula is rather against this view.

In the total number of 20 cases, there were 11 deaths and 9 recoveries; seven cases were not operated upon, only one recovered; in this case, a hernia of the pancreas presented through the wound two days after injury, the hernia was removed by slowly tightening a wire round its pedicle. Thirteen cases were operated upon, with eight recoveries and five deaths. The operations performed were, drainage of pancreas four cases, one death; suture of pancreas, with or without drainage, five cases, all of which recovered.

An important fact brought out by this series of cases is the fact that all the cases (four in number) in which the wound of the pancreas was either not discovered, or not treated at the operation, died. These 4 cases added to the 7 unoperated cases, make a total of 11 cases in which the pancreatic injury was untreated, with only 1 recovery.

The importance of examination of the pancreas in bullet wounds of the lesser omentum and stomach is obvious.

Garré reports, from his clinic in Konigsberg, a case of total subcutaneous transverse tear of the pancreas. About three hours after the injury, the abdomen was opened, and the pancreas repaired with silk sutures. The wound was drained and recovery followed.

TREATMENT OF SEPTIC PERITONITIS.

Le Conte, in a paper read before the Philadelphia Academy of Surgery (*Ann. of Surg.*, 1906, Vol. I.), quotes the histories of two patients suffering from diffuse spreading septic peritonitis, which were successfully treated according to the principles

formulated by Murphy. The essentials of Murphy's technique are stated thus :—

1. The rapid elimination of the cause of the peritonitis. This must be done with the least possible handling of the peritoneal contents.

2. Drainage by tube of the lowest portion of the pelvis through a suprapubic opening, and free drainage through the operative incision.

3. The elimination of all time-consuming procedures at the time of operation.

4. The semi-sitting position of the patient after operation.

5. The absorption of large quantities of water through the rectum, which reverses the current of the lymphatics of the peritoneum, making the surface of that membrane a secreting instead of an absorbing one, and also increasing the secretion of urine.

6. The prevention of peristaltic movements of the intestines by withholding all food or liquids by the mouth, and perhaps by the administration of opium.

Commenting on these points, Le Conte says the less the peritoneal surfaces are handled in removing the cause of the peritonitis the better, thus avoiding the danger of removing the protecting lymph which inhibits the absorption of toxic substances. Murphy believes that no attempt should be made to wipe off any lymph that may be found. As regards the suprapubic drainage, with the patient in the Fowler position, all fluids in the peritoneal cavity will tend to gravitate towards the pelvis and, in addition, the action of the diaphragm during respiration will help to pump the fluids in that direction, making drainage of the lowest part of the pelvis with a tube very important.

Murphy's method of introducing large quantities of wate into the rectum is by means of gravity irrigation. A nozzle, with three or four openings, is inserted into the anus and connected with a bag filled with water elevated a few inches above the level of the rectum. In this way, from one to two pints of water are allowed to trickle in during an hour, the flow being continuous. Food and liquid by the mouth are stopped with the object of preventing the dissemination of septic material by peristaltic movements. The absorption of large

quantities of water by the rectum is quite sufficient to sustain the patient for 48 hours or more.

McCosh (*Med. News*, November 1905; *Journ. Amer. Med. Assoc.* 1905, Vol. II.) considers the important features of operation for septic peritonitis to be: (1) rapidity, (2) gentleness, (3) removal of the cause, (4) post-operative adoption of the Fowler position.

If the peritonitis appears to be general, he thoroughly irrigates the abdominal cavity with normal salt solution, and then injects 30 grms. of a saturated solution of magnesium sulphate into the upper part of the small intestine. Several drains are employed, one of them being generally placed above the pubes.

In the *Centralblatt fur d. Grenzge*, Vol. 3, Nos. 4–9 (*Journ. Amer. Med. Assoc.* 1905, Vol. II.), Klinik gives a collective review of the surgical treatment of peritonitis based on 598 articles on the subject. In 1,009 cases, the peritonitis was the result of appendicitis, the percentage of cures being 35; but considering only the 482 operations performed since 1900, the percentage of cures rises to 45. Fifty-two cases of peritonitis from gastro-intestinal perforation show 27 per cent. of recoveries. Pneumococcic peritonitis in children is generally cured by operation (80 per cent. recoveries in 50 cases), all that is needed being evacuation of the abscess and extensive drainage.

A circular letter sent by Young (*Journ. Amer. Med. Assoc.* 1905, Vol. II.) to the leading American surgeons, in order to find out the treatment they adopted, led him to the following conclusions:—

1. Early operation.

2. Simple incision with simple drainage, and removal of the cause with the least possible handling of viscera.

3. Fowler's position in order to retard lymphatic absorption which takes place *via* the diaphragmatic peritoneum.

4. Large quantities of saline solution by the rectum.

5. Antistreptococcic serum in suitable cases in hope to combat the effect of toxins absorbed.

The question, in answer to which there was the greatest divergence of opinion, was that of irrigation of the abdominal cavity. The upholders of irrigation were in the majority, they

report altogether 252 cases with a mortality of 79 per cent. The minority of surgeons, who do not employ irrigation, report a total of 92 cases with a mortality of less than 20 per cent.

Dudgeon and Sargent, in a bacteriological study of peritonitis (*Bacteriology of Peritonitis*. Constable, 1905), also deprecate irrigation of the peritoneal cavity. Their clinical results bear out in a remarkable way the principles deduced from pathological material. In 14 cases of appendix-peritonitis, in which the colon bacillus was present in the exudate at a distance from the cæcal region, three recovered. Two of these were treated by appendicectomy, local dry sponging, and drainage. The third case (in which a local abscess had apparently become diffused a few hours before operation) was treated by appendicectomy, general lavage (without evisceration) and drainage. Of the 11 fatal cases, all were treated by copious lavage, assisted, in the majority, by evisceration. Out of 119 cases of diffuse peritonitis of unknown bacteriology due to appendicitis, 100 were treated locally, with a mortality of 47 per cent.

Of 25 cases operated upon by Sargent, 19 were treated by evisceration and lavage, with 18 deaths; 6 were treated locally, and all recovered.

The chief conclusions arrived at by Dudgeon and Sargent as to the treatment of diffuse peritonitis, are as follows :—

1. The majority of cases should be treated by local dry sponging.

2. Mild infections, such as gastric perforations and intraperitoneal hæmorrhage, require thorough washing in order to remove foreign material.

3. Peritonitis, due to streptococcus pyogenes, or bacillus pyocyaneus, appears to be uniformly fatal whatever the treatment adopted.

4. In mild diffuse infections, such as gastric perforations or intraperitoneal hæmorrhage, drainage is, as a rule, unnecessary.

5. In severe diffuse infections, drainage is advisable, though from the nature of the condition often ineffectual.

6. Inasmuch as intestinal paralysis allows the colon bacillus to attain its maximum virulence, and as, in all probability, it

makes its way through the intestinal wall, it is of importance that the infective material shall be eliminated from the bowel without delay. Further, it remains to be proved that the intestinal movements have much to do with spreading the infection; and, as morphia has a marked inhibitory effect upon leucocytosis, they recommend purgatives and not opiates as a post-operative routine.

Mesenteric Tumours and Cysts.—A case of a large solid sarcomatous tumour is recorded by Vance (*Annals of Surgery*, March, 1906), who also collects 27 examples of solid mesenteric growths from the literature of the past five years. The most common tumour growing in this situation is, apparently, the fibroma; the next, in point of frequency, being the sarcoma.

The diagnosis of these growths is fraught with difficulty; they need to be differentiated from ovarian cysts, tumours of the pancreas and kidney, and cysts of the spleen.

In the same number of the *Annals of Surgery*, Porter treats of mesenteric cysts, and reports a case of multiple chylous cysts associated with a volvulus of the ileum. From an examination of the literature, wherein 20 cases are recorded, he points out that the important symptoms are recurrent attacks of abdominal pain, accompanied by obstructive symptoms and associated with the presence of a centrally attached abdominal tumour. If the tumour is movable, fluctuating, and crossed by a band of resonance, the diagnosis may be made with some degree of confidence. Chylous cysts have no common origin, but may arise from various sources.

A review of enteric and mesenteric cysts by Ayer is contained in the *American Journal of Medical Sciences*, January, 1906. He states that enteric cysts originate in an occlusion of the mouths of the intestinal glands. Mesenteric cysts may be classed as follows: (1) Parasitic; (2) embryonic; (3) cysts of normally-placed retroperitoneal organs; (4) cystic malignant disease.

Prize Essay.

THE CAUSATION OF INFANTILE CONVULSIONS.

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In dealing with a subject such as the one about to be discussed, viz., the causation of infantile convulsions, we must always be careful to recollect that convulsions do not constitute a disease *per se*, that a convulsion is a symptom, an important piece of evidence of a more important affection in the background, and, until this underlying causative condition has been determined, treatment on rational lines, the ultimate aim of medicine for the general practitioner, can be at the best merely palliative. In the present essay, an attempt is made to elucidate these underlying conditions—the "fons et origo mali"—of which the convulsion is but one form of expression. Enquiry will be limited to "violent, involuntary, and irregular muscular contraction accompanied by partial or total loss of consciousness," thus leaving on one side the irregular movements of chorea, or the condition of tetany.

A convulsion is the expression of insufficient control of muscular action; theoretically, therefore, there are two sources from which a convulsion may arise.

i. By excessive stimulation of muscles with normal amount of control or inhibition, *i.e.*, with relatively deficient inhibition.

ii. By lowering of the power of control, with normal muscle stimulation, *i.e.*, with actually deficient inhibition.

The difficulty in classifying the numerous causes of infantile convulsions under these two simple heads arises from the fact that the degree of control is variable in each individual patient, so that we can have no "normal" to go upon in the case of children, and secondly, from the fact that the inhibitory, or controlling, centres are inextricably interwoven with the

sensory-motor centres, over-stimulation of which results in a convulsion.

When we come to analyse the various causes, it will be seen that the majority arise from a temporary suspension of the function of inhibition, which suspension is itself due to some alteration in the condition of cerebral circulation, usually in the direction of anæmia, a deficient supply of blood to the brain, coupled with abnormal excitation of motor centres; other cases are due to some condition of toxæmia, either the circulation of some active poison in the blood, or the absorption of poisonous substances from the non-removal of waste products. In rare instances abnormal excitation of motor centres may alone suffice, especially in patients whose higher controlling centres are only at an early stage of development.

Direct causes will be first dealt with in the present essay, since occasionally these appear to be sufficient of themselves to bring about a "fit," while the presence of one or more of the conditions or states, to be later spoken of as predisposing causes, renders the patient liable to have a convulsion on slight provocation.

The following are the more direct causes of infantile convulsions :—

(1) *Irritation in Cerebral Disease*, either cortical, dural, or due to pressure from within. Thus, a tumour underlying and spreading towards the cortex, or an adhesion from a scar resulting from an old wound of the dura, the pressure of an enostosis, the pressure of fluid as in acute hydrocephalus, will produce convulsions.

If consciousness is retained during the early part of the fit, if the convulsive movements are limited to one side, or, as is less probable, to one limb, and if the attack starts each time in the same manner, the cause may be assigned to gross disease within the skull. At the same time we must not forget that, in children, a lesion which is unilateral may cause bilateral convulsions, and also in some cases in which the convulsions have been mainly, if not entirely, unilateral, nevertheless after death no difference can be detected in the two hemispheres.

(2) *Traumatism.*—(i) With direct action on the brain, as in depressed fracture of the skull or cerebral hæmorrhage. Such are seen as a result of cranial injuries sustained at birth, or later as illustrated by the following which occurred in my

own practice about four months ago. The patient, a healthy, well-nourished child, aged a year and eight months, fell from its nurse's arms from a height of 10 feet, striking its head on a flagstone pavement. The child fortunately wore a bonnet, which to some extent protected the head. There was a marked depression at the junction of the frontal and parietal bones on the right side. It was picked up unconscious, and on my arrival, a few minutes after, had a violent convulsion, lasting some two minutes, limited to the left side of the body, face, arm, and leg. This was repeated twice during the ensuing quarter of an hour. The parents were strongly opposed to operative interference. During the evening the fits, always confined to the left side, recurred three or four times only, and the child recovered consciousness at about eight p.m., four hours after the accident. On the following day there were two slight fits with little, if any, loss of consciousness (the child being very irritable, this was not easy to determine). The patient is now well and walks about the house, and appears healthy and intelligent; in fact, there is no sign at present of its recent injury.

(ii) Hæmorrhage resulting in cerebral anæmia: as is seen where convulsions occur shortly before death from severe loss of blood.

(iii) Shock. Seen when convulsions follow severe abdominal injury, or an extensive skin lesion, such as results from a burn involving a considerable amount of surface.

(3) *Reflex Irritation.*—A few instances of this may be cited by way of examples:—

(i) Eruption of the teeth. This is probably a less potent cause than it is generally supposed to be. During the period of dentition, especially if any sign of inflammation of the gums exists, a convulsion is ascribed to this condition, and often no other cause is looked for. The parents themselves are frequently to blame for this, since, having attributed the fit to "teething," they think that there is nothing to do but wait, and consequently fail to seek advice. Others go still further, and regard any upset at the time of first dentition, whether accompanied by an inflammatory state of the gums or not, as due to the process of eruption of teeth, which they think is always attended with disorders of various kinds; in fact, from their point of view, the normal thing, and therefore a matter

to be severely left alone. Personally, I am inclined to think that dentition is important, as one of many combined factors in causation of convulsions at this time. In the first place, irregular or delayed eruption of the teeth is a common occurrence of those with a rickety tendency, and this, the primary and predisposing factor, so brings it about that a small additional stimulus, such as tender inflamed gums, is sufficient to produce an attack, which might not have resulted had not this underlying condition been present. It must be borne in mind also that the period of first dentition is one fraught with danger from the many changes which are simultaneously taking place. A great alteration in diet is usually being made, the glandular structures of the bowels are undergoing development, but have not yet come into proper working order, and an upset is readily induced; the inhibitory and controlling system of nerves has not yet become properly established. With such an unstable condition, it is not surprising that a nervous storm is easily precipitated.

Against the fact of "teething" being the only or even the main factor in many of these cases, there is the statistical evidence that, though convulsions are commonest in the first year of life, nevertheless about 70 per cent. occur within the first six months, *i.e.*, before the beginning of dentition.

ii. Gastric and Intestinal Disorders. Irritating ingesta, either unsuitable or undigested contents, constitute a fruitful cause of convulsions. In some children, mere overfeeding may lead to a fit, the stomach being unable to dispose of all that is put into it, and occasionally a child may die in an attack of convulsions, and yet, post-mortem, nothing beyond an overloaded stomach is discovered. The stomach itself may be in an irritable state and intolerant of its customary food, as after an attack of diarrhœa, when ordinary milk, which was formerly digested normally, is now vomited back, or acts as an irritant and leads to the production of convulsions. It has been estimated that 80 per cent. of cases of infantile convulsions may be attributed to gastro-intestinal troubles.

Constipation, similarly, may be a cause, by the retention of matter which should be discharged, aided by a certain amount of auto-infection which takes place by re-absorption of poisonous metabolic products.

iii. Ascariasis. I am inclined to think that too many cases of convulsions in childhood are ascribed to worms. These are present in many infants who never suffer from convulsions, and, as is well known, may be found in the vomit or motions quite accidentally without having given rise to any symptoms. When in large numbers, there is probably some condition of the bowel which is associated with and favours their presence, and this disorder, not merely the existence of the worms, acts reflexly, as mentioned in the last paragraph, and results in a convulsion. Convulsions are commonest in the first six months, while worms are comparatively rarely found under the age of two years.

iv. Peripheral Nerve Irritation. Earache in some children may result in convulsive attacks, but, in ascribing them to this cause, one must be careful to exclude cerebral or meningitic mischief secondary to otitis. Similarly, severe skin lesions, such as an extensive burn, may be followed by widespread convulsions, though here again we must exclude those due to exhaustion following such an injury. An extensive eczema has also been reported as having a like result. I have seen one case in which circumcision, performed before the little patient was sufficiently anæsthetised, was succeeded by a convulsive seizure. Under this same head would be placed laryngeal cases, in which the accidental falling of a few drops of milk into the glottis sets up spasm, which may end in a convulsion.

(4.) *At the Onset of an Acute Infectious Fever.*—The cause of the actual fit in these cases is probably a toxæmia, due to the poison circulating in the blood, aided by a lowering of the power of the controlling centres; the second of these may itself be a result of the former, the blood containing the poison producing direct lowering of inhibitory power, or causing constriction of vessels, so that a deficient supply of blood, and that not pure, reaches the brain. In an adult, where the controlling centres are in full development, a rigor takes the place of the convulsion of infancy. The fevers most commonly ushered in by convulsions in children are scarlet fever, measles, and pneumonia. In two instances abroad, I had the unusual experience of coming across cases of ague paroxysms initiated by convulsions in place of the customary rigor. In pneumonia,

those cases in which the disease is situated at the apex are said to begin in this way with greater frequency than those in which the base is involved. I am unable to confirm or deny this from personal experience, as in a limited number of apical pneumonias, with which it has been my lot to meet, they have been about equally divided. In the case of whooping-cough, where the paroxysms are unusually severe (but not at the onset) I have seen fits occur; these are probably due to the excessive venous congestion produced, or, in rarer instances, to actual cerebral hæmorrhage. As a sequela of whooping-cough, I have recently seen a case where a broncho-pneumonia, which ensued, was probably of tuberculous nature, and meningitis followed by vomiting, "hydrocephalic cry," retraction of head, and convulsions.

Sudden rise of temperature will in some children result in a convulsion, apart from the onset of specific fevers. In these cases there is usually a neurotic tendency, for it is found that in children of such a stock a degree of fever which produces the fit in one child or one family does not do so in another.

(5.) *Rickets.*—Authorities differ as to the frequency of rickets and convulsions occurring together. In the form of laryngismus stridulus, rickets is undoubtedly common, but less so in the generalised forms, though rickets is probably more common than the majority of people think. Amongst the poor it is very frequently seen, and statistics are largely taken from this class, where feeding is faulty in the amount and quality of food given, but it also occurs among the well-to-do, and arises from the wrong nature of the food.

Rickets also acts as a predisposing factor, for, in rachitic children, serious illness of various kinds may terminate in convulsions. On the other hand, it is not the chief predisposing cause, for the disease does not in the majority of cases appear till the second half of the first year, while convulsions are most fatal, if not actually most common, during the former half. Rickets may act indirectly in other ways also, as, *e.g.*, by leading to deformity of the ribs, and thus hindering proper oxygenation of the blood in respiration, so that an inadequate supply of blood passes to the brain; secondly, the softness of the skull bones may allow a certain amount of compression of the cranial contents.

Rickets is so largely associated with convulsions because this disease implies retarded development, and the nervous system shares in this retardation with the rest of the body, so that minor stimuli result in overaction, and convulsions ensue.

Convulsions may also occur towards the termination of any wasting disease, whether accompanied by rickets or not; thus, in marasmic states, or in severe gastro-enteritis with exhaustive vomiting or diarrhœa. Probably several factors are at work here: the gastro-intestinal disorder, the absorption of poisonous products, the cerebral anæmia, or, in some cases, thrombosis.

(6.) *Poisons.*—Convulsions occur from overdoses of drugs, such as strychnine, or occasionally from administration of lead, given perhaps for obstinate diarrhœa. Again, from the presence of metabolic products in the blood, as in uræmic convulsions of renal disease, the toxins of various infectious diseases, the acute fevers, pneumotoxin of pneumonia, tetanotoxin of tetanus, etc. The auto-infection from absorption of ptomaines or other metabolic products in gastro-intestinal disorders may produce convulsions, but here there is the additional factor that intestinal maladies are of themselves a potent cause.

(7.) In *Congenital Heart Disease*, associated with marked cyanosis, the occurrence is not infrequent. The convulsions may then be due to insufficient supply of blood to the brain or to intense venous congestion, just as they occur in the congestion of whooping-cough, as mentioned above, or in a prolonged fit of crying. How often one hears the statement from a mother that she gives her child anything it cries for, and all sorts of food, in order to stop the child "crying itself into a fit"! In this case also probably more factors than one are at work; we have the loss of control, or rather the insufficiently developed control, the intense congestion, and in some cases the onset of a spasm of the glottis, or at least some respiratory interference.

(8.) *Epilepsy.*—There is in all probability some fairly intimate connection between epilepsy and convulsions in infancy. A large proportion of those who in babyhood suffered from convulsions, nearly 50 per cent. were, by one

authority, found to suffer in later life from neuroses of various kinds, such as true epilepsy, chorea, migraine, etc. And from the opposite point of view, it appears from statistics that, in more than 10 per cent. of epilepties, the fits began under the age of three years. The difference between infantile convulsions and true epilepsy consists merely in the fact that the former are transient, while the latter are more permanent, or, at any rate, tend to recur; and even this is not a constant difference, for the former, if the cause continues to act, or the underlying condition remains unremedied, may continue with intermissions for a long period. Possibly, untreated infantile convulsions by repeatedly lowering the developing inhibition may become habitual, and thus pass on to true epilepsy.

(9.) *Fright* or strong emotional upset, as, for instance, a violent fit of crying, as stated above, may produce a convulsive fit. Angel Money regarded this as a form of cortical epilepsy. Similarly, emotional disturbance at a later age not infrequently results in chorea, so that here again the close connection is seen between epilepsy and other convulsive affections of infancy and childhood.

An account of the ætiology of infantile convulsions would not be complete without some notice of predisposing causes. Rickets has already been spoken of, but two others of importance remain, viz.: Age and Heredity.

Age.—The controlling or inhibitory centres are developed later than other parts of the child's nervous system. This readily explains the fact that convulsions are commonest in the first month of life, nearly 50 per cent. of fatal cases occurring then, according to one authority, though by most this is considered unduly high. Helping to constitute this large proportion will, of course, be those patients who suffer from cerebral injury at birth. The most generally received theory is that the higher centres being imperfectly developed at an early age, *i.e.*, the controlling centres in the frontal lobes, an afferent stimulus removes the slight degree of control, and irritation is succeeded by a much greater response than in later months when these centres have gained in power.

Heredity.—Convulsions are not inherited, but the diathesis, the nervous predisposition, is undoubtedly hereditary—the

patient is born with a "convulsive tendency." The parents, or one of them, may have suffered from epilepsy, while the children may exhibit neuroses of various forms: thus, one may have attacks of chorea, another may be asthmatic, a third be a martyr to migraine, and so forth.

The neurotic tendency is, according to some authorities, a still more potent factor when combined with alcoholism in the parents.

Summing up, therefore, in conclusion, we have as predisposing causes: age, heredity and rickets, and, as more direct causes, first, cerebral irritation either from disease, traumatism, or shock; secondly, reflex disturbances, which may be numerous and varied, as examples may be cited dentition, gastro-intestinal disorders, worms, peripheral nerve irritation, as in earache or glottic spasm: thirdly, less common forms, such as at the onset of acute specific fevers, in congenital heart disease, and in cases of poisoning; lastly, the fits may be true epileptic, or as a result of a fright or strong emotion—Money's cortical epilepsy.

In the majority of cases, no one of these causes acts singly; in by far the greater proportion, two or more are at work, there being often some underlying condition rendering the subject liable to the precipitation of an attack of convulsions on comparatively slight provocation.

SOME FAMOUS QUACKS.

I.

COUNT CAGLIOSTRO.

QUACKS, and the rest of the large army of impostors who live by practising on the vanity and credulity of their fellow men, have flourished in all ages, and in all countries; but the eighteenth century seems to have been especially prolific of them, and France, which claims to be the birthplace of ideas, and particularly Paris, the so-called City of Light, was their most profitable hunting ground. The times were propitious, for in spite of the wave of scepticism which had passed over the whole of Europe, people in every rank of society were almost childishly credulous and superstitious, and intensely curious about the supernatural. Moreover, there was a feverish eagerness for new fashions and sensations. It is no wonder, therefore, that a clever cheat, who could play on human folly and ignorance, and sound them from their lowest note to the top of their compass, was able to impose upon thousands, and gather round him a crowd of disciples, some doubting, many more following him because he was the fashion, and others because they were bored and wanted a new amusement. Mesmer, Swedenborg, and many others, had strutted their brief hour upon the stage, and passed off, when Cagliostro made his entrance on the scene and forthwith took Europe by storm. A good deal of his success was due to the fact that his country, his birthplace, and his parentage were all, like the origin of Jeames, "wrop in mistry." He described himself variously as the son of the last King of Trebizond, the foster-child of the Scherif of Mecca; he called himself Acharat, the pupil of the learned Althotas, the scion of an ancient and noble family. The fashionable men and women, who flocked round him to hang on every word he uttered, would have been extremely surprised if they had known who the Count Alessandro di Cagliostro really was. For this quack of quacks, as Carlyle aptly calls him, was the son of a poor struggling shopkeeper of Palermo, Pietro Balsamo, and Felicità Braconiere, his wife. By their neighbours they were considered to be of Jewish

origin ; and it is a curious fact that Cagliostro always manifested a great liking and admiration for Jews, and, moreover, was usually considered by Italians to speak Italian like a Jew, with their accent and jargon.

Joseph Balsamo was born at Palermo on June 8th, 1743, and only a few months after his birth his father went bankrupt and died, leaving his widow and children nearly destitute. He was an unruly boy, and, after running away from school several times, he was sent, at the age of 13, to a convent of the Brothers of Mercy, or Benfratelli, who looked after the sick. Joseph was put under the infirmarian, from whom he doubtless learnt some rudiments of medicine and chemistry, which were to be so useful to him in later days. The monks could do nothing with him, and he returned to Palermo, where before long he was the companion of all the rogues in the city. From his childhood he had been a thief, and he now began to show an aptitude for forgery and a taste for occult science, which, naturally, he used for swindling purposes. To escape imprisonment, he fled to Messina, where he fell in with a Greek or Spanish adventurer named Altotas or Althotas, for nearly everything connected with this man of mystery, including the spelling of names, is uncertain. The two rogues travelled together through Greece, Egypt, and Asia Minor, giving exhibitions of magic, and everywhere preying on the public. From Asia Minor they went to Malta, where they were welcomed with open arms by the Grand Master of the Knights of Malta, Don Manuel Pinto d'Alfonseca, an alchemist, who spent most of his time seeking for the philosopher's stone. At Malta his companion died, and Balsamo, armed with letters of recommendation from the Grand Master, went to Rome. Those letters procured for him admission to several of the great houses of Rome. Later he used to boast of the favour shown him at that time by Pope Clement XIII. and Cardinal York. This statement is difficult to reconcile with the fact that he had to work for his living by making pen-drawings, or rather by "faking" prints to make them look like etchings. It seemed, indeed, as if he had some thought of leading an honest life, for he married Lorenza Feliciani, the daughter of a coppersmith, and lived for a time with her parents in outward respectability. But he soon went back to his old ways, and had to leave Rome to escape arrest for forgery. He and his

wife, who proved a ready tool in his hands, wandered about Italy, Spain, and Portugal, in the disguise of pilgrims, living on the alms of the pious whom they beguiled. In 1771, when they had successively made Barcelona, Madrid and Lisbon too hot to hold them, they set sail for England. They found few dupes in this country, however, and the attentions of the police becoming inconveniently pressing, they deemed it prudent to shift their quarters to Paris.

In the French capital Joseph blossomed into the Marquis de Balsamo, possessor of secrets for the cure of disease, the rejuvenation of the aged, the concoction of poisons, the making of gold, the transformation of cotton into silk, the softening of marble, and all sorts of marvels. But he was soon forced to leave Paris, and after trying his luck in Brussels and various cities in Germany, he returned to Italy. We hear of him at Naples, selling an elixir of beauty, transmuting mercury into gold, making pearls and diamonds larger and so forth. Balsamo and his wife next extended their operations to Marseilles, Barcelona, Valencia and Cadiz. In the last-named city trouble awaited them. Balsamo had sold to a Spaniard various magic herbs and other ingredients which he said were necessary to make the philosopher's stone, receiving as payment a thousand crowns and a valuable cane, the head of which was formed by a magnificent watch. But the philosopher's stone failed to appear and the dupe's eyes being opened, he put the police on the track of Balsamo, who fled to England in 1776. As the name of Balsamo was by this time somewhat too well known, he appeared in London first as the Captain, afterwards developing into the Colonel and Marquis de Cagliostro. A true *faber fortunæ suæ*, not content with making a name for himself, he manufactured a life-history, as mythical as his name. The only thing wanting to complete his nobility was some ready money. This deficiency he proceeded to supply in the usual way by swindling, with the result that he made acquaintance with the inside of an English prison. Nevertheless, on his release from durance vile, he contrived to keep up the appearance of a man of rank, and he managed to gain the reputation of being an illustrious chemist and a man of science and a benefactor of mankind. As the British public loves a lord, it is not surprising that this vulgar impostor should have deluded people more successfully by the display

of the outward and visible signs of wealth, than when he lived in beggarly surroundings. We are inclined to think, however, that it was to another cause that he largely owed his new prosperity. In 1777 he had been received as a Freemason at a Lodge in the King's Head Tavern, Gerard Street, characteristically describing himself for the occasion as Colonel of the Third Brandenburg Regiment. But still his evil fate pursued him, and soon after his initiation he left London, leaving at his lodgings a trunk, which he said was filled with valuables, which, when opened, was found to be as empty as the famous coffer of Madame Humbert.

By this time Cagliostro had determined to become a rogue on a grander scale than he had yet attempted. He and his wife travelled no longer as poor pilgrims, but surrounded by couriers, lacqueys, and valets in gorgeous liveries; they journeyed in a private carriage, magnificently dressed and covered with diamonds as false as themselves. He scattered money right and left; one cannot help wondering how he came by it. His wife had a power of fascination which Cagliostro encouraged her to use without scruple, and this helped the worthy couple to keep up appearances. His fame went before him from city to city. It was said that he could raise the dead, that he had infallible remedies for every disease, that he could restore lost youth and vigour, that he could discover treasure and make the philosopher's stone, and that he could foretell the future. He found blind believers among rich and poor, and the few sceptics, who declared him to be nothing but a clever charlatan, were looked upon almost as blasphemers. How could a man who always travelled so luxuriously, who always had plenty of money, and who wrought marvellous cures and performed miracles without asking for pay, be a common adventurer?

No doubt a great part of Cagliostro's wonderful success was due to the Freemasons, who, looking on him as a distinguished member of their craft, naturally wished him to further their cause. With this object, they encouraged and protected him, giving him introductions, and, most probably, also the money which enabled him to live in such luxurious style. Certainly, it was chiefly the Freemasons he had to thank for the disciples and partisans he found wherever he went.

Freemasonry, indeed, played a large part in Cagliostro's career, and if it helped him to his greatest triumphs, it brought about his final ruin. He invented a so-called Egyptian rite, which he declared to be purer than all others, these being tainted with sorcery. In the working of this vein of deception, as of many others, his wife, Lorenza, was of the greatest use to him, nor did he scruple to make what profit he could of her powers of fascination. As the medium for the revelation of the true light of Freemasonry, he got many to believe him, and for their edification he wrought some startling "miracles." In this way he became very popular and was able to reap golden harvests in every city he visited till his character came up with him. At Mitau, in Courland, for instance, he led captive the minds of the people to such a degree that they wished to dethrone the reigning Duke and put Cagliostro in his place. In no long time, however, he fell from his high estate and came to be looked upon as an emissary of the Jesuits sent to instil superstition into the people. Although, doubtless, Cagliostro would have been willing to be the agent of any body that would have helped in his profession of gulling the simple, there seems to be no evidence of his having been associated with the Jesuits. It is not easy indeed to believe that so astute a body could have used so discreditable a tool.

Cagliostro next went to Russia, his prophetic soul apparently not dreaming of the things that were to come upon him there. Though the Empress Catharine II. was favourably inclined towards the man of whom she had heard such wonderful stories, Cagliostro had, from the outset, an implacable and powerful enemy in Rugensohn, chief physician to the Empress and Councillor of State. For Cagliostro's luck seemed to have deserted him. He completely failed to cure a gentleman afflicted with blindness, who put himself under his care. Nor was he more successful in his treatment of the bald head of an officer; not a single hair appeared to reward his efforts. He was still more unlucky with regard to an Italian, whom he treated for deafness with the result of making him worse. Another case is said to have led to his hasty departure from Russia. A child aged about two was dying, and the despairing

mother offered Cagliostro a large sum of money if he would undertake to cure her darling. This he readily did, saying that the cure would take eight days. On the second day the child became much worse, and Cagliostro insisted on taking it to his own house for treatment. On the fifth day he said the illness had taken a favourable turn, and on the eighth he gave the poor mother glad tidings of great joy, telling her the child was completely cured. He did not, however, restore it to its mother's arms for three weeks. Then, alas! it turned out to be a changeling, and Cagliostro was obliged to confess that the ailing babe had died and he had substituted another for it; the corpse, he said, he had burnt by way of experiment. There is said to be good ground for questioning the truth of this story, and, indeed, it is scarcely credible that so clever an impostor as Cagliostro should have acted so foolishly. The real reason of his leaving Russia was his assumption of the title of colonel in the Spanish army, and the exposure of the fraud by the Spanish ambassador.

Turning his steps towards Poland, he began to work the miracle of cure and other wonders at Warsaw. He found his stay there profitable, for he left with a considerable accumulation of jewels and a large sum of money. Though Cagliostro always professed to accept no fees, he did not refuse valuable presents.

We next hear of him at Strassburg, which he entered on September 19, 1780; a vast crowd had assembled to witness the arrival of the famous healer. He was careful, however, not to outrage public opinion by ostentatious display. He at first led a very retired life, giving himself to the care of the sick poor. For his services he would take neither fee nor reward; and if a grateful patient offered him a present which he could not refuse without giving offence, Cagliostro made a point of giving something of greater value in return. Frequently he would take patients into his own house, where he treated them gratuitously for many months. At the same time he kept open house; he and his wife clothed themselves in purple and fine linen and feasted sumptuously; they played high, and withal paid their way. Where did the money come from? That is a mystery which no historian seems to have penetrated. At a later period he found a gold mine in the Cardinal de Rohan;

but at this time either the Freemasons must have financed him, of which there is no proof, or he must have lived on the spoils he had gathered in Poland.

The glimpses we get of him at Strassburg enable us partly to realise what manner of man he was. He went but little into society, but in certain *salons* he posed as a prophet, striking attitudes and speaking a mysterious jargon made up of fragments of French, Italian, and Arabic. His medical knowledge, as may well be conceived, was of the scantiest. At Warsaw he had delivered a course of lectures on medicine, consisting of the usual attacks on orthodox practice, mingled with venerable precepts stolen from the School of Salerno, and magical formulæ taken from a book by a quack named Frederick Gualdo. At Strassburg he confessed his want of learning, for, in reply to a question on the subject, he said all he knew of science and medicine might be expressed in these words: *In verbis, in herbis, in lapidibus.*

Through his rooms there passed daily a continuous stream of sick people, most of whom, it is needless to say, had been given up by the doctors. That many of them were cured may readily be believed; it was their faith in Cagliostro, not his treatment that made them whole. Like all faith healers he was successful in cases of mind paralysis, and like the pagan temples of antiquity and many Christian shrines of to-day, the walls of his consulting room were decorated with sticks and crutches left as tokens of cure by cripples to whom he restored the use of their limbs. He failed, of course, in dealing with real disease, but this did not injure him in the eyes of his infatuated adherents, for the failure was held to be due to some shortcoming on the part of the patient. The Marquis de Cambis, Lieutenant-General of the King's army, who for twenty years had suffered from the effects of a wound, died under his hands. The case was carefully watched, six surgeons attached to the Military Hospital of Strassburg drawing up a daily report of the different phases of the disease and of the effects of Cagliostro's treatment. The failure was, like Falstaff's lies, gross as a mountain, open, palpable; but the quack's popularity did not suffer. The only result seems to have been that he went back to the practice of miraculous healing. In Strassburg he found a place where credulity

reigned supreme, and among Cagliostro's most fervent admirers were the leaders of the society of the city. But he flew at still higher game. It is probable that he went to Strassburg with the object of exploiting the Prince Cardinal, Louis de Rohan, a man of immense wealth with a weak head and a natural disposition to dabble in the occult. He was too clever to show any eagerness to make his intended victim's acquaintance. When the Cardinal was suffering from asthma and sent for him, Cagliostro, with a fine air of independence, answered, "If my Lord Cardinal is ill, he must come here, and I will cure him; if he is well, he does not want me, nor I him." This brought Rohan to the feet of the quack. The Cardinal's faith and admiration were boundless; after the first interview he told the Abbé Georget that he desired nothing more ardently than a closer acquaintance. This closer acquaintance Cagliostro was wise enough to withhold at first. During the Cardinal's ensuing visits he was reserved, almost hostile; but by degrees he grew more friendly, acquiring in this way an almost boundless influence over his dupe. Finally this son of a bankrupt shopkeeper told the descendant of one of the oldest families in France: "Your soul is worthy of mine, and you deserve to be the participator of all my secrets!"

The Cardinal had before this lodged Cagliostro in his palace, putting his house and servants at his service, and loading him with gifts. Cagliostro received all these favours with the air of bestowing a favour upon the giver; he had the art, without asking for anything, of inducing his dupe to shower upon him money, jewels, and other property, which he appeared to take with reluctance, as if they were forced upon him.

From 1780 to 1785, Cagliostro and his wife lived with the Cardinal, from whom they extracted vast sums. In return for his princely hospitality Cagliostro assisted his host in his search for the philosopher's stone, and went through the whole of his magical repertoire. From every side the Cardinal was warned against the man who preyed upon him, but his faith was not to be shaken. Yet, despite the Cardinal's protection, life was none too easy for Cagliostro at Strassburg. His success brought him many enemies, chiefly amongst the doctors, who did him all the harm they could. In 1782, a

surgeon named Sachy published a *Mémoire*, in which he declared that he had formed a partnership with Cagliostro to practise medicine, that they had quarrelled, and that Cagliostro had refused to pay him his share of the spoils This *Mémoire*, though written by one who was almost as great a quack as the man he denounced, did Cagliostro so much harm that he found it convenient to be summoned to the bedside of a dying friend at Naples. Thence he went to Bordeaux where he remained nearly a year, during which time such crowds of people flocked to his house that the troops were called out to keep order in the street in which he lived. He left Bordeaux with five thousand crowns in his pocket which had been given to him by an old lady on his promise to discover a treasure hidden on some land she owned, and believed to be guarded by spirits. He returned to Strassburg followed by twelve ladies of quality and a couple of actresses, who were anxious that their cure should not be interrupted by the loss of their doctor.

Cagliostro finally left Strassburg in 1785, and went to Paris, where he was well known owing to a cure he was supposed to have wrought in the case of the Prince de Soubise. Still financed by the infatuated Cardinal, he established himself and his wife in a fine house, where, in accordance with their usual custom, they lived at first very simply, rejecting all advances from the great world by whom they were eagerly sought after. Cagliostro had another reason for shunning publicity at this time, for the King suffered him to stay in Paris only on condition that he did not meddle with magic; he was also the object of a close watch on the part of the police, and of the jealous curiosity of the Faculty of Medicine. He did indeed practise medicine, in spite of King and Faculty, but he was careful to take no fees.

The Parisians for the moment had no quack to worship, and were casting about for some one to take the place of Mesmer. They soon found what they wanted in Cagliostro. He and his wife became the objects of a kind of cult in which the whole of Society joined. It became the fashion to be under Cagliostro's care, and the doctors who tried to expose him were scoffed at as pedants. They had a clever impostor to deal with. It is said that two medical students were per-

suaded by their masters to play a trick on Cagliostro. They went to his house, one of them playing the part of a patient suffering from a very strange disease. But in describing his symptoms he used scientific terms, and the quick-witted quack at once saw through the plot. Turning to the supposed patient's companion, he said he would keep his friend with him for sixteen days, and during that period, which was absolutely necessary for the cure, he would allow him no more than sixteen ounces of food in sixteen separate meals. Horrified by the prospect, the student asked to be informed what disease he was suffering from; Cagliostro answered by writing on a piece of paper: "Superabundance of bile in the gentlemen of the Faculty."

Cagliostro was mixed up in the affair of the Diamond Necklace, but for once in a way he seems to have been more sinned against than sinning. The notorious Madame de la Motte, who contrived that historic swindle, naturally looked with no friendly eyes on a rival bird of prey who had selected the same victim. Cagliostro seems to have believed in the forged letters of Marie Antoinette, and in the Cardinal's mansion in Paris he on one occasion invoked the angels, from whom he received the assurance that the affair of the necklace would restore Rohan to the Queen's favour and bring him into power again. Cagliostro, however, soon began to suspect that something was wrong, and he warned the Cardinal that he was in great danger in Paris, and advised him to live quietly at Saverne. Before long Rohan had cause to regret that he did not take this advice. He was arrested in August, 1785; and Madame de la Motte, to save herself, accused Cagliostro of being the originator of the plot. He and his wife were sent to the Bastille. While there he published a reply to the charges brought against him by Madame de la Motte, which had a great success. When the case was tried Cagliostro was acquitted, and his restoration to liberty was made the occasion of a popular demonstration. The next day he received orders from the King to leave Paris within a week, and France in three weeks. It is said that, in the hurry of his departure, he forgot to pay his rent.

He came to England, and in London published his famous "Letter to the French People," which made a sensation

throughout Europe. Encouraged by this, he demanded compensation from the French Government, but without success. In fact, although he was declared to be innocent, the affair of the necklace ruined him. He was abandoned by the Cardinal, and thenceforward the course of his life lay steadily downhill. London would not accept his offer to light the town by means of sea-water, which he declared he could render as combustible as oil. Nor would the people buy his pills and balsams. Even Freemasonry failed him.

In the spring of 1787, Cagliostro left London for ever, taking with him the jewels of his wife, whom he omitted to inform of his departure. She revenged herself by telling all whom it might concern that her husband the Count was in reality the quack Joseph Balsamo. Nevertheless, she rejoined him afterwards in Switzerland, where he found shelter for a time with a banker who still believed in him, "among the faithless, faithful only he." Here, again, Cagliostro's efforts to spread the knowledge of the Egyptian Rite got him into trouble, and, driven by the police out of every town he entered, his fate led him, in May 1789, to Rome, where he and his wife, ragged and penniless, found an obscure shelter. Cagliostro tried quackery once more, but there was no market for his love philtres and elixirs of beauty and youth. In despair he turned to Freemasonry, and this soon brought him into the clutches of the Inquisition. On December 27th, 1789, Cagliostro and his wife were arrested and taken to the Castle of Sant' Angelo. All his papers and his Masonic documents were seized. So great had been his confidence that he had burned none of his papers, and thus an enormous mass of correspondence, notes and documents, of a hopelessly compromising character, came into the hands of his judges. The trial took place in April, 1790. Cagliostro was worn and aged by many months of prison, and without help of any kind. Yet to the last he believed he would triumph over his enemies. He defended himself very cleverly, trying to perplex his judges, as he had so often fooled other hearers, by a mass of verbiage. But it was to no purpose. The death penalty, which was the punishment of Freemasonry, was remitted, and he was condemned to perpetual imprisonment. His papers and effects were burnt

by the public executioner. Condemned at the age of 45 to a living death, he made one or two ineffectual efforts to escape, but after a time seems to have resigned himself to the inevitable. A mystery hangs over the last scene of all. He was taken in the dead of night to the fortress of San Leo, in the Duchy of Urbino. From that time all traces of him are lost. There are no authentic proofs of his death; but tradition says that he died in August, 1795, and it is hinted by some that his end was hastened by his gaolers.

Of Cagliostro's appearance we get a glimpse from a contemporary who saw him in Paris. He says the quack appeared to be moulded expressly for the rôle of Signor Tulipano, in the Italian Comedy; he was of middle size, somewhat fat, with an olive complexion, a very short neck, a round face with two large prominent eyes and a broad turned-up nose. Carlyle's wonderful word-picture may be given here: "Fittest of visages; worthy to be worn by the Quack of Quacks! A most portentous face of scoundrelism: a fat, snub, abominable face; dew lapped, flat nosed, greasy, full of greediness, sensuality, ox-like obstinacy; a forehead impudent, refusing to be ashamed; and then two eyes turned up, seraphically languishing, as in divine contemplation and adoration; a touch of quiz too: on the whole, perhaps, the most perfect quack-face produced by the eighteenth century."

Of Cagliostro it may be said that he was the genius of quackery. He made the most of the scraps of chemical and medical knowledge which he had picked up here and there, but these by themselves would not have carried him far. It was his immeasurable impudence that made him supreme among quacks. After all it is not so much the quack who deceives the people as the people that are eager to be deceived. This eternal "touch of nature" was never more strikingly illustrated than in the career of Joseph Balsamo, Grand Kophta of Egyptian Masonry, inventor of the Wine of Egypt (of which the active ingredient was cantharides), of the elixir of life and eternal youth, of the Pentagon which was to regenerate man and restore him to his primitive state of innocence lost by original sin, the raiser of the dead, the Archquack, whose nature was compounded of deceit, and whose whole life was made up of fraud and imposture.

NOTES FROM FOREIGN JOURNALS

TRAUMATIC DERMATITIS.

Sabouraud has recently commended the use, in cases of dermatitis with great irritation, of:—

℞ Zinci Oxidi - - - - part. j.
Ol. Amygd. Dulcis - - - } ana partes ij. M.
Lanolini - - - - }

To be spread on lint and applied to the part affected.

HAY-FEVER.

E. Fletcher Ingals, in *The Medical Bulletin*, gives the following as a useful spray in hay-fever:—

℞ Resorcin. - - - - gr. v.
Adrenalin. Chloridi. - - - - gr. ss.
Acid. Boric. - - - - gr. xv.
Glycerini. - - - - ʒss.
Aq. Camphorae (calidum) - - - ʒss.
Aq. Destill. - - - ad ʒij. M.

To be sprayed into the eyes and nose four or five times a day.

HYPERIDROSIS OF FEET.

Procq recommends the following:—

℞ Sodii Salicylat. - - - - ʒss.
Potass. Permangan. - - - gr. xv.
Talc. Pulv. - - - - ʒj.
Bismuth. Subnit. - - - - ʒiss.

Ft. Pulv. pro applic.

RINGWORM.

A 4 per cent. solution of formalin in glycerine is greatly praised in the *Clinical Review* as a most efficient remedy for this troublesome affection. All grease must first be removed from the part affected—by the use of turpentine and then soap and water. The formol-glycerine is then applied, and the applications are repeated for about an hour.

ARTIFICIAL RESPIRATION IN ACUTE OPIUM POISONING.

An editorial in the *Therapeutic Gazette* calls particular attention to the value of artificial respiration in the treatment of opium poisoning. Severe cases undoubtedly die through failure of the respiratory centre, and the inability on the part of the physician to maintain by Sylvester's method a sufficient interchange of air and CO_2 in the lungs. Fell, of Buffalo, some years ago advocated the use of bellows to supply air to persons suffering from respiratory failure, and, by means of O'Dwyer's laryngeal tube, it was found that the lungs could be fully inflated and artificial respiration carried on without the help of the respiratory centre. Cochran

reports several successful cases treated in this way in the *China Medical Missionary Journal*, Nov., 1905. The article suggests that at least every hospital should be provided with Fell's apparatus.

ENTEROPTOSIS IN WOMEN.

Visscher points out (*Southern California Practitioner*) that the liver is the main factor in enteroptosis, and quotes Einhorn, who states that a movable liver can be found to some degree in over 3 per cent. of all persons suffering from indigestion. He condemns the corset as a chronic and recurring source of injury. The essential pathological conditions are inanition and lowered intra-abdominal pressure, and the symptoms are displacement, traction, sacculation, disturbance of peristalsis, blood stasis, and disturbed function of splanchnics. Enteroptosis has a bad effect on the pelvic organs, not only by direct pressure, but by hampering the return flow of blood. Out-door life and active exercise are advised for prophylaxis. For treatment, horizontal rest is suggested as a means of relieving the venous circulation in the displaced organs, and of overcoming stretching and kinking of the mesenteric veins. Over-feeding must be instituted to accumulate fat, and rest for the nervous system. In addition, light abdominal massage and general massage must be carried out. The knee-chest position should be assumed several times during the day. Active purging must be avoided, and a low abdominal corset worn, which leaves the ninth and twelfth ribs free from pressure. A plaster bandage has given good results. Enteroptosis is encouraged by letting patients get up too soon after labour, panhysterectomy, removal of tumours, or the operation for appendicitis; also by allowing patients to be underfed, or improperly fed and filled with wind, and vigorously purged. Surgical interference is only advised for the cure of hernia, movable kidneys accompanied by Dietl's crises, or repeated attacks of jaundice.

THE GRAPHIC METHOD IN GYNÆCOLOGY.

R. de Seigneux (Geneva) describes, in the *Revue Médicale de la Suisse romande* for April, the method he has adopted, and has for some time past put into practice, of recording the "gynæcological life" of his patients on a chart. There is often very great difficulty in estimating at their true worth the events of past history, as related by the patient herself, and, recognising the importance of loss of blood in the diagnosis of cancer of the womb, and also the difficulty of obtaining exact accounts of menstrual periods, De Seigneux endeavoured to arrange a method of showing on one page, schematically, the whole year's history of all loss of blood from the uterus, menstrual and otherwise.

The chart is divided into 365 vertical columns, one for each day of the year, each period of five days and each month being marked by heavier lines. These are crossed by four horizontal lines, marked $\frac{1}{2}$, 1, 2, and 3. The charts are of such a size that they are easily folded into four, and then occupy but little room. Any loss of blood, however small, is blacked in by pen or pencil on the corresponding day, to line 1 if the loss is normal, to line $\frac{1}{2}$ if the loss is slight, to line 2 if the loss is large, and to line 3 if real hæmorrhage occurs.

At the end of a year, therefore, the chart will give full information as to: (1) the regularity of menstruation; (2) the length of each period; (3) the length of each interval; (4) the quantity of blood lost; (5) the duration, frequency, and amount of every haemorrhage which has occurred during the year.

Pain is marked by a cross placed under the corresponding day, and the degree of severity is shown by underlining once or more times. This gives the information as to (1) whether the period is accompanied by pain or not; (2) on what day of the period the pain occurs; (3) whether there is any pain between the periods; (4) the severity of the pains.

By studying such a record, it can be seen at once whether any irregular bleeding has occurred, and, as this is admitted to be one of the earliest symptoms of cancer, suspicion will be aroused, and steps can be taken to proceed to early operation, after exploratory curettage and microscopical examination have placed the matter beyond question.

Dr. Sutton gives each of his patients one of these charts, and inspects it every three months. He thinks that the method will soon be taken into general use, while women will get into the way of going to see their medical man at regular intervals to be assured "that everything is in order," just as is done with regard to the teeth. He suggests that such a course would assuredly be one of the most practical and efficacious methods for bringing about an operation for cancer of the womb, as soon as the earliest clinical symptoms make their appearance. This would greatly improve the results obtained, which are still far from satisfactory.

THE RELATION OF LACERATION OF THE CERVIX TO THE DEVELOPMENT OF CANCER.

West, in the *Yale Medical Journal* of November 1905, states that he has never seen a single case in which cancer has developed in the uninjured cervix. He quotes Craig to the effect that investigation of the subject does not show any evidence of cancer occurring in a cervix successfully repaired. Smith states that cancer has almost disappeared from his clinics, because women are no longer allowed to go about with a cervix full of scar tissue. West's experience is that the majority of patients who present themselves with this disease have got beyond operation, and that, even where such is possible, there is no hope of a radical cure. Return is inevitable. He recommends complete removal of the uterus and appendages in every case offering any hope. Every practitioner should be quick to note the first symptoms of the disease, leucorrhœa or serous discharge, not necessarily with bad odour, and irregular bleeding. Pain is not often present. Bleeding and foul-smelling chocolate-coloured discharge are symptoms of later stages. (*Therapeutic Gazette.*)

TO STOP HICCOUGH.

Dr. Argellier, of Billom, publishes, in the *Lyon Médical*, a very simple method, which he found most serviceable in a case of hysterical hiccough. The attack was one of extreme violence and resisted all treatment, but ceased almost at once when the patient was given a piece of sugar moistened in vinegar. This was munched up quickly and then swallowed. In ordinary cases of severe hiccough, the effect is immediate and never fails.

EXPECTORANTS.

Prof. Eichhorst, in the *Deutsche med. Wochenschrift*, includes narcotics under this heading, and considers that the best way to check the fits of coughing due to tracheitis is to give the following :—

℞. Codein. Phosph. - - - - - - - gr. v.
Aq. Amygd. Amer. - - - - - - ℥ss. M.
To take ten drops three times a day.

If the coughing fits are accompanied with anorexia, nausea, etc., this may be given :—

℞. Codein. Phosph. - - - - - - - gr. v.
Syrup. Rubi. - - - - - - - - ℥vj.
Acid. Phosph. Dil. - - - - - - - ℥iij.
Aq. - - - - - - - - - ad ℥vj. M.
Ft. mist. Capiat ℥ss. ter quotidie.

All the other narcotics are open to objection and should not be used, as they produce disagreeable secondary effects. In every case this class of remedy must be given up when the air passages are clogged with secretions, for there is a risk of setting up or of increasing cyanosis.

The true expectorants exert a dissolvent effect upon tenacious and adherent secretion, and when this is present it is useful to prescribe :—

℞. Potass. Iodid. - - - - - gr xlv.
Syrup. - - - - - - - ℥ss.
Inf. Ipecac. (radicis) - - - - ad ℥vj. M.
Ft. mist. Capiat ℥ss. secundis horis.

Apomorphia and pilocarpine have the disadvantage of exerting a hyposthenic effect upon the myocardium. An expectorant effect is obtained at once by means of the following prescription :—

℞. Acid. Benzoic. - - - - - gr. v.
Camphoræ - - - - - gr. ½
Pulv. Sacchar. - - - - - gr. iij. M.
Ft. pulv. Mitte tal. dos. Numero X. Cap: secundis horis.

For chronic affections, like bronchorrhœa and putrid expectoration, the balsams are best, especially the essence of terebinth (1 drachm in three doses during the day in milk); myrtol (in gelatine capsules containing gr. iiss) every two hours, is an excellent remedy. For the others, including the balsam of Tolu, the author has no use.

Catarrhal bronchitis is often of an infectious nature, and Eichhorst prefers to treat these seasonable attacks with benzoyl-guaiacol, or benzosol, in doses of 7½ grains, three times a day. It is given as a powder flavoured with peppermint and sugar. For chronic catarrhal bronchitis he recommends the fluid extract of hydrastis, ♏xx.–xxx., four times a day.

Steam may be included among the expectorants; the patient's room should be saturated with it. Lying face downwards, with the legs raised above the level of the trunk, will help expectoration in some cases; and another aid is rhythmical compression of the lower part of the chest.

THIOSINAMINE IN THE TREATMENT OF TINNITUS.

In *Merck's Archives* of April, McCullagh writes in favour of the use of this drug. The list of drugs already recommended for this affection is a

long one, proving the little effect they really produce. This drug has a selective action upon connective-tissue neoplasms, which are diminished or rendered inert. Very few cases of any disease are recorded in which this drug has been used, although its theoretical advantage is generally recognised. Beck reported five cases treated exclusively by the emetine without a single success, whereas mechanical treatment had benefited 7 other cases. Somers records 12 cases, of which 2 were cured, 6 were sufficiently improved to leave off the treatment, 1 case was improved, and 3 others remained in statu quo. In order to obtain the best results, the treatment should be kept up for six weeks, and should be accompanied with mechanical treatment. McCullagh, however, believes that good results can be obtained by keeping on the administration for a longer time, according to the degree of the sclerosis present. In cases of vertigo, it is necessary to give larger doses. The most favourable cases to treat appear to be those in which the hypertrophy affects the tonsil as a symptom, and the Eustachian tube. Equally good results were obtained by giving the drug by the mouth as subcutaneously. Some patients noticed a marked improvement in hearing when the tinnitus stopped.

DIURETICS.

McAlister has an outspoken article in the *Journal of the Medical Society of New Jersey* for January on "Essentials in Diuretic Treatment." He considers that diuretic treatment, which presumes the liberation of nascent reagents in the blood, that these chase up and down the tissues until their chemical greed has been satisfied, and then yield themselves up to the kidneys to be expelled from the system, is, to say the least of it, highly theoretical. Such claims as these, however, for fancy diuretics are daily paraded before the profession. Calculi are dissolved quite easily in a mortar, but the body is not a crucible. Preference is now increasingly given to the simplest remedies, which for the most part are the older members of the U.S. Pharmacopœia, and are chiefly vegetable productions. The reason for this is clear, seeing that their value has been established beyond all question. They undergo little or no change in passing through the alimentary canal, and, further, they do not upset digestion, but, on the contrary, tend to stimulate it. This applies to the vegetable acids and their salts, and to certain resin bearing leaves of which buchu is the type. By dint of long experience, certain drugs can be blended so as to produce diuretic mixtures which are practically ideal, and seldom fail to bring about the maximum diuresis quickly and harmlessly. The bowels must receive proper attention before special diuretic treatment is begun. In most cases a brisk saline purge will answer best. The special diuretic action of water should not be overlooked, and it should be taken freely with the medicines ordered, as well as during the intervals, if possible, and when there is no accumulation of fluids to be removed. Very moderate exercise in an airy room, or even in the open air, should be undertaken at the same time, but perspiration must be avoided. These remarks presume the absence of nephritis and serious heart trouble, in presence of which all diuretic treatment will fail.

As to what remedies will blend to form a good diuretic mixture, it may be said at once they are not new, neither are they "made in Germany." Buchu, with one or more of the members of its valuable family, one of the vegetable acid salts, a nerve sedative for a corrective, and ether to help

diffusion, form such a mixture. If a distinct astringent is called for, uva ursi is preferred, and, for a volatile diffusible effect, oil of juniper should be added.

These mixtures are not novelties, but their general utility and trustworthiness are commanding increased attention. No synthetic or inorganic remedies, old or new, approach them in value.—(*Therapeutic Gazette.*)

THE VALUE OF GELATINE IN THE DIET FOR PHTHISIS.

Robin and Binet have been carrying out researches in this subject (*Bulletin générale de thérapeutique*). It is recognised nowadays that gelatine cannot replace the albuminoids in dieting, and that the greater part of this body, being finally destroyed in the organism, cannot help in the building up of the tissues. But, as in the process of decomposition, it draws upon itself some part of the hydrolytic, reducing and oxidising powers of the economy, it is for that very reason capable of protecting the proteid constituents of the organs and tissues, and of lessening the loss of fat. It, therefore, allows the individual to be satisfied with less proteid matter in his diet, and acts as a real proteid-sparer. Robin and Binet find that if gelatine, provided it does not prove distasteful, is taken regularly, it can exert a very important sparing action.

Given at the rate of 5 drachms a day, it diminishes the respiratory exchanges, and in phthisical patients thus brings about a sparing action, of which the feeding can take advantage. Raw meat must, therefore, not be given in too great quantity to phthisical patients who are taking gelatine, as the restrictive influence of the latter upon the respiratory exchanges will be weakened. The ration should not exceed 3 to 4½ ounces; with this the sparing action of the gelatine is kept up, and may even increase to a slight extent. The ordinary commercial gelatines, however purified they may be, are more or less badly tolerated by the stomachs of tuberculous patients. In order to disguise the insipid flavour, it should be dissolved in bouillon, or reduced to coarse powder and mixed with the food. But the majority of patients turn against it, sooner or later, and it is difficult to keep it up for more than thirty days successively. To guard against this difficulty, there is no other way, among the poorer classes, than to make bouillon out of the tendinous parts of the meat, of bones in as large quantities as possible, plenty of vegetables, and allow the gelatine to be dissolved during cooking. Part of the bouillon thus made can be taken hot, the rest will set in a jelly which has a pleasant flavour, and can be eaten with relish at other meals.

For patients of the better class, the difficulty is more easily overcome, as the commercial gelatine can be replaced by gelatinous foods, such as calf's head, sheep's feet, pig's feet, calf's foot jelly, meat jellies, and fruit jellies (particularly apples). By the help of these, it will be quite easy to ensure that the patient takes his proper dose of proteid-sparer.

LOCAL TREATMENT OF MUMPS.

Ragozzi recommends in *Nouveaux remédes* the use of the following:—

℞. Guaiacol. - - - - part. j.
Vaselin. - - - - } āā part. x. M.
Lanolin. - - - - }
Ft. ung.

"To be rubbed into the parts affected night and morning, and then covered with gutta-percha, over which is placed a bandage with some amount of pressure."

TREATMENT OF RHINO-PHARYNGITIS IN CHILDREN.

Le Marchadour, in the *Journal de Medecine*, describes the methods he adopts. He introduces, three or four times a day into the nostrils, tampons of absorbent wool, drawn out to a point, and holding boric vaseline, to which can be added astringents.

℞. Acid. Boric. - - - - - - - - - 1 part.
Antipyrin. - - - - - - - - - ½—1 part.
Vaselin. - - - - - - - - - - part. xx. M.

Menthol in oil can be used instead for children who cannot stand the tampons, or who will not allow them to be introduced.

Bigger children should take either of these powders :—

℞. Aristol.
Lactosi. - - - - - - - - - āā ℈j. M.

Or,

℞. Mumin. Aceto-tartrat. - - - - - - - - ℈j.
Lactos. - - - - - - - - - - ℈ijs. M.

At the same time local applications for the naso-pharynx must be made by means of sprays of boric acid solution, or salt solution with the water of Enghien, Challer, or Mont Dore.

If the effect is delayed, the pharyngeal surface must be directly treated by swabbing with iodised glycerine (equal parts), or with the following :—

℞. Iodi Pur. - - - - - - - - - gr. iv.
Potass. Iodid. - - - - - - - ℈ss.
Ess. Menth. Pip. - - - - - - - - ♏iv.
Glycerini. - - - - - - - - ℈v. M.

Twice a week, afterwards once, the naso-pharynx must be gently massaged by means of a curved probe wrapped round with absorbent wool in such a way as to pass behind the soft palate. More energetic rubbing helps greatly to reduction of the congestion of the mucous surface.

As most of these children are lymphatic, general treatment, based upon cod-liver oil, iodo-tannic syrup, and good feeding, should also be undertaken.

Reviews of Books.

Drink Restriction (Thirst Cures), particularly in Obesity. being Part VI. of several Clinical Treatises on the Pathology and Therapy of Disorders of Metabolism and Nutrition. By Professor Dr. CARL VON NOORDEN, Physician in-Chief to the City Hospital, Frankfort-on-Main, and Dr. HUGO SALOMON. Pp. 86. Bristol: J. Wright & Co. London: Simpkin, Marshall & Co. 3s. net.

ACCORDING to the American editor, this little book is a most instructive deliverance upon a subject of the highest practical importance one which should appeal strongly to both the medical profession and the laity, and we are inclined to agree with him, for it is a well-known fact that most people partake of too great quantities of fluids, and, for the matter of that, of solids also.

Dr. von Noorden first reviews the latest experiences of the application of thirst cures in diseases of the blood vessels, the stomach, the heart, the kidneys, and in diabetes insipidus, and maintains that, especially in diseases of the heart and kidneys, the restriction of liquids is of the greatest value, while in diabetes insipidus, the reports on the results obtained are too contradictory to be of much use. He then criticises the Oertel-Schweninger method for reducing obesity, and proceeds to review the physiological investigations concerning the effect of thirsting on the organism, which are worth a careful study.

The experiments conducted by himself and Dr. Salomon are given with careful detail, and lead, among others, to the following conclusions—that the restriction of liquids is followed by relief to the stomach and the heart, a decrease in body-weight, a reduction of the appetite, and, if carried very far, by an increased destruction of albumin; but that the claim, that the combustive processes going on in the organism were increased and accelerated, and particularly fat destroyed, was not established.

In fine, it is clear that, in the hands of an experienced physician, the method of restriction under certain conditions is as important as the opposite method is in others.

We cordially commend this careful and useful little monograph.

Photographic Atlas of the Diseases of the Skin. By GEORGE HENRY FOX, A.M., M.D., Professor of Dermatology, College of Physicians and Surgeons, New York. London: J. B. Lippincott Co. 25s. each part.

WE have received the first three parts of this work. A good atlas may in some degree supply the deficiency of those who lack the opportunity for the clinical study of skin diseases, and the author has undoubtedly succeeded in producing a life-like representation of the commoner forms of cutaneous diseases in his series of coloured photographic plates. The excellence of this combined method is well illustrated by the plates of tinea versicolor, or chromophytosis, as the author calls it,—an uncoloured photograph of which would show little or nothing,—and lichen planus,

in which the surface markings, so difficult to reproduce in a painting, are faithfully preserved, together with the characteristic tint of the disease. The alphabetical arrangement, adopted in the present edition, leads to a curious juxtaposition of diseases. It is, for instance, a shock to turn from ichthyosis to impetigo, or from lepra to lichen planus, and to find favus sandwiched in between erythema multiforme and multiple fibroma. Herpes is illustrated by herpes faciei, but zoster is not forthcoming, and is doubtless deferred to the end. The terminology is in many instances confusing, or obsolete: such names as lichen ruber papulosus, lichen ruber squamosus, for varieties of pityriasis rubra pilaris, and the old-fashioned lupus excedens are better avoided.

We do not look for an exhaustive account of cutaneous therapeutics and pathology in a pictorial atlas, but we are astounded when we are told that eczema is of internal origin in nearly all cases, and when we are advised to treat most cases, whether acute or chronic, by means of rubber cloth.

Sanitary Laws of Scotland and Principles of Public Health. By W. J. Brock, D.Sc., M.B., F.R.S. (Edin.); Medical Officer of Health for Mid- and West-Lothian, &c. Pp. xii + 480. London: Oliver & Boyd. 7s. 6d. net.

This book is intended for those who are officially concerned with, or otherwise interested in, public health work in Scotland. In addition to the Sanitary Acts, Local Government Board's regulations, etc., it contains a great deal of statistical information, notes on food, water, and air, useful formulæ and tables, and a digest of "Cases on the Sanitary Law."

The book is printed on thin paper, and weighs only 8 ounces, so that it can, if desired, be carried about in the pocket for immediate reference.

Medical Electricity and Light Treatment: A Practical Handbook for Nurses. By Kate Neale, Sister-in-charge of the Actino-Therapeutic Department, Guy's Hospital. London: The Scientific Press. 2s.

This little handbook, though prepared for the instruction of nurses, will be useful to those practitioners and students whose knowledge of electricity is very limited. The descriptions of apparatus and instruments, as well as of electrical theories, and the modes of action of the various rays used in medical treatment, are given in simple yet accurate language. The reader is thus enabled to learn the practical details of application of galvanism, Faradism, vibratory massage, static electricity, high-frequency currents, X-rays, and Finsen light. Having had extensive experience in the training of nurses, the authoress has become acquainted with the commoner errors made by beginners, as well as with the chief difficulties, practical and theoretical, that perplex the novice. She is to be heartily congratulated on the methods by which she shows that these difficulties may be overcome.

Essentials of Surface Anatomy. By Chas. R. Whittaker, L.R.C.P., L.R.C.S., Demonstrator of Anatomy, Surgeon's Hall, Edinburgh. London: J. and A. Churchill.

This short volume of 48 pages, interleaved with blank sheets for the student's own notes, is only intended to be of use in a quick revision of the salient points of surface marking. As such it may be useful to the student

about to present himself for examination. The information contained is put in the briefest way, and for the most part is quite accurate. The author places too much reliance on the nipple as a landmark in surface anatomy; in marking out the liver he should make use of more constant landmarks. The size of the page, too, is inconvenient. The book would have been much more useful had it been made to fit the pocket, and have thus been at hand for constant reference by the student a few days prior to his examination.

Transactions of the Medico-Legal Society, 1904–1905.

The second volume of these Transactions maintains the high character to which the first attained.

All the contributions are of interest to medical practitioners. That on "Sterilization of Degenerates" opens up a wide field, which, as one would expect, affords opportunity for much difference of opinion.

Bateman's article on Professional Secrecy is excellent, and should be read by every practitioner of medicine. Further excellent matter is found in "Notes on Suicide," and notes on the law of evidence, by Wynn Westcott, and Sir Joseph Walton, respectively. The little volume presents a handy and up-to-date set of articles on some of the most important subjects in legal medicine.

A Manual of Diseases of Infants and Children. By John Ruhräh, M.D., Clinical Professor of Diseases of Children in the College of Physicians and Surgeons, Baltimore. Pp. 392. 112 illustrations, 1 coloured plate. London: W. B. Saunders & Co.

This little book is intended for the use of senior students, and appears to be yet another addition to the long list of "cram books" made possible by the modern system of medical education and examination.

The subject matter is naturally much compressed, and suffers in consequence. We think, however, that room should have been found for such details as the treatment of chorea by spinal douches, the *rôle* of cyto-diagnosis in cases of meningitis, and the surgical treatment of Erb's paralysis.

The chapters on respiratory diseases and the anæmias seem to be unduly cut down, and that on the latter subject, in particular, is but scantily supplied with those bibliographical references, which are plentifully given throughout the rest of the book, and which do much to raise it above the usual standard of "cram books." Infant feeding is treated at considerable length, and the chapters which deal with it and with diseases of the digestive system are among the best in the book. An appendix, dealing with therapeutics, is given, and should be of use. Almost all the illustrations are good, some are excellent.

Atlas and Epitome of Operative Ophthalmology. By Prof. D. O. Haab, of Zurich. Authorised translation from the German with editorial notes and additions by G. E. de Schweinitz, A.M., M.D., Professor of Ophthalmology in the University of Pennsylvania, &c. Pp. 377. With 30 coloured lithographic plates and 154 text cuts. London: W. B. Saunders & Co. 15s. net.

This book is an admirable guide for senior students, practitioners, and ophthalmic surgeons in the technic of operations on the eye, and

their various modifications. It will be found to be exceedingly useful by those, too, who have to assist at such operations, inasmuch as it readily indicates the steps in the operation and the instruments which will be required. All the illustrations are excellent, especially those which are coloured, for they not only demonstrate the various operations upon the cervix and orbit, but, in many cases, introduce pictures to illustrate the condition of things after recovery has taken place. The whole volume impresses one with Professor Haab's wide experience and technicality. Many comments, and the description of a few operations not described by Professor Haab, have been introduced by the editor.

Clinical Obstetrics. By Robert Jardine, M.D., F.R.S. (Edin.), Professor of Midwifery in St. Mungo's College, Glasgow, and Senior Physician to the Glasgow Maternity Hospital. London: Rebman, Ltd.

Although the clinical teaching of medicine and surgery receives much attention, and many excellent text-books on the subject exist, yet the clinical teaching of obstetrics has been almost entirely neglected. We welcome Dr. Jardine's work, which has now reached its second edition, as an attempt to correct this anomaly.

It is a very excellent and practical account of clinical obstetrics, and a number of instructive case histories has been incorporated into the text. The author points out the great benefits, which have accrued to surgery, by the adoption of antiseptic, and latterly aseptic, methods. The same benefits might be claimed for obstetrics by the adoption of the same methods. Unfortunately puerperal sepsis is still far too common.

In the treatment of puerperal eclampsia, Dr. Jardine still insists on the value of saline injections and on the harmfulness of morphia. He also strongly condemns plugging in the treatment of accidental haemorrhage, a method of treatment which is warmly advocated by the Rotunda School. An appendix, dealing with the statistics of thirty years' work at the Glasgow Maternity Hospital, completes the volume.

The type and general get-up of the book are excellent. We cordially recommend every student and practitioner to read it.

Manual of Psychiatry. By J. R. de Farsac, M.D. Translated by A. J. Rosanoff. Edited by Joseph Collins. Pp. xii + 352. Large 12mo. New York: John Wiley & Sons. 10s. 6d. net.

This little book well sustains the reputation of French writers for the charming style in which they dress their material, and for the well-balanced proportion in which they treat of its various aspects. The work has, on the whole, suffered little in translation, albeit the English reader will be disappointed at the nearly complete absence of references to English literature.

The book is planned in two parts, the first containing "A Study of the Causes, Symptoms, and Treatment of Mental Disorders, considered independently of the affections in which they are encountered." The individual psychoses are given in the second part: there is, in most cases, a mere mention of the symptoms, for the recognition and interpretation of which the student is referred to the first part. Unfortunately this plan contains defects as well as merits. In the first part the beginner will meet

with such words as catalonia, paranoia, and the like, and he has to refer to the second part to discover the clinical significance of them.

The matter of the book contains little that is original. Copious extracts from the works and writings of Griesinger, Joffroy, Séglas, and Wernicke are given in the first part, while in the second the classification of mental diseases follows closely on the lines suggested by Kräpelin. In a few unimportant particulars Kräpelin's classification is departed from. Thus, chronic delirium is separated from the dementia prexcox group, and the poly-neuritic psychoses is placed among the psychoses of auto-intoxication.

The chief drawback of the book is due to an endeavour to present too concise an account of too wide a range of subjects. This fault is, however, common to all "manuals" of psychiatry.

The Bacteriology of Peritonitis. By L. S. Dudgeon, M.R.C.S. (Lond.), and P. W. G. Sargent, M.A., M.B. (Cantab.), F.R.C.S. (Eng.). London: Constable & Co. 7s. 6d. net.

This book is a very valuable record of research work into the bacteriology of peritonitis. It formed the basis of the Erasmus Wilson Lectures at the Royal College of Surgeons in 1905, and is an attempt to place the bacteriology of peritonitis on a sound basis, especially as a guide to the rational treatment of that condition. Previous observers have generally employed material obtained from the post-mortem room. The authors show the futility of this, and have obtained their material from living patients during the performance of laparotomies. The importance of the colon bacillus in causing peritonitis is insisted upon, and it "plays by far the largest part in hurrying our peritonitis cases from the wards to the post-mortem room."

The book abounds with important observations and conclusions. Whether these will meet with ultimate acceptance only future research will show. In any case, the work is so important that it should be widely read, and it will doubtless stimulate further researches into this very important subject.

The Medical Epitome Series. Genito-Urinary and Venereal Diseases. A Manual for Students and Practitioners. By Louis E. Schmidt, M.Sc., M.D. London: Hodder & Stoughton.

This work, consisting of some 240 pages, may be described as an epitome of the main clinical and therapeutical points in genito-urinary and venereal diseases. The first part of it deals with syphilis, congenital and acquired, and chancroids. These diseases are dealt with briefly, from a clinical and therapeutical standard, but as fully and as concisely as is consistent with the objects of the book. The various methods of examination of the urethra and bladder, the examination of the urine and urinary discharges, are very clearly described, and in this connection much information of a very useful and practical nature is afforded. The treatment of gonorrhœa in all its stages is very lucidly detailed. Brief but concise accounts are given of the various diseases of the kidneys, ureter, bladder, testicles, prostate and seminal vesicles, and the treatment of these conditions is clearly indicated. The book is well written, and the author,

in compiling an epitome of venereal urinary and venereal diseases, has produced a manual for students and practitioners, to whom it must prove of great value.

A Handbook of Intestinal Surgery. By Lockwood Bidwell, F.R.C.S., Surgeon to the West London Hospital, Consulting Surgeon to the Blackheath and Charlton and Diss Hospitals. Pp. xii + 167. Demy 8vo. London: Baillière, Tindall & Cox. 6s. net.

To the practitioner, who wishes to equip himself for the performance of the many and various operations upon the intestinal tract, we can heartily recommend this book.

While not professing to be an exhaustive treatise on intestinal surgery, it affords detailed instruction in the methods of intestinal suture and anastomosis, as they are performed on the living subject. For practising these methods of suture, the author advises the use of bullocks' intestine, a material which he finds resembles the living human intestine more closely than the intestine obtained from the post-mortem room.

He has devised a form of intestine holder, which does away with the necessity for an assistant in practising the operations upon the bullocks' intestines. The two final chapters are devoted to an account of the author's methods of procedure in the actual performance of an abdominal section.

The Medical Epitome series. 1. *Physical and Inorganic Chemistry.* 2. *Organic and Physiological Chemistry.* By Alexander McGlashan, M.D. London: Hodder & Stoughton.

In these books an attempt has been made to condense all the essential facts of the subjects treated of into a very small space with the inevitable result that many errors of omission are noticeable. Many elementary errors are also scattered throughout both books. For instance, in the first volume, Avogadro's Law is stated, and the reader is informed that the atomic weight of oxygen is consequently 16. No hint even of the necessity for showing that the molecules of hydrogen and oxygen consist of the same number of atoms being given. Again, it is stated that the atomic weights of elements are inversely proportional to their specific heats. The essential qualification "in the solid state" being left out. In the same connection, boron and carbon are mentioned without any statement as to their abnormality.

On page 65, a substance is mentioned as showing, on analysis, 46 per cent. sodium, 12 per cent. carbon, and 48 per cent. oxygen (total 106 per cent.). These numbers have been chosen apparently, not from analytical results as stated, but because the numbers given are exactly divisible by the respective atomic weights.

Mica is spoken of as isinglass. This may be an American synonym, but in England the two words are used for very different substances, and strange results might happen from the substitution of the one substance for the other.

As the books, though written in America, are published in London they are, presumably, intended for English medical men and students. This being so, it would have been well to have given the British Pharmacopœia strengths and doses, instead of those of the United States.

Le Livre de la Sage-femme et de la Garde; suivi de quelques mots sur le traitement du Cancer de l'Uterus. By Dr. R. DE SEIGNEUX. Geneva: Henry Kündig.

THIS is an excellent handbook and guide for midwives. It has been carefully compiled from the *Instructions aux Sages-femmes du Canton de Vaud* of 1834, which, in a manner, constitute the code of rights and duties of the midwife in that country. In addition to an obstetrical agenda and a series of blank case-sheets, it consists of an "Aide-mémoire" and "Instructions to Midwives," together with an account of the treatment of uterine cancer. The "aide-mémoire" sets forth the diagnosis of pregnancy, of the position and presentation of the child, the stages of labour, and the hygiene of pregnancy in a manner suitable for the midwife. In the Instructions, the duties of the midwife are clearly defined, as are also the conditions under which the presence of the physician is demanded. The ten pages devoted to the treatment of cancer of the uterus are the most interesting in the book. They contain an account of the work of Professor Winter of Königsberg in his struggle against cancer. The importance of early diagnosis is insisted upon. Midwives are often in a position to observe its earliest symptoms, and it is urged upon them to recommend immediate attendance on the physician of all women suffering from any uterine trouble whatever, particularly uterine hæmorrhage, and more especially if the hæmorrhage occurs about, or after, the critical age of the menopause.

Laputa revisited by Gulliver Redivivus in 1905. Pp. 124. London: Hirschfeld Brothers, Ltd. 1s. net.

To practitioners and others who, after the toils of the day, would enjoy the restfulness of a quiet read, and the relaxation of a hearty laugh, we can sincerely recommend this very smart little satire. All sections of modern society, in those of the abnormally intelligent aborigines of Laputa, come under the lash of the witty author of this suggestive little volume. We need not say any more than read, mark, learn, and inwardly digest, and, possibly, an attack of indigestion may be avoided.

Chemical Analysis. By HUGH CANDY, B.A., B.Sc., F.I.C., Lecturer on Chemistry, London Hospital Medical College. London: J. and A. Churchill. 3s. 6d. net.

THIS book, as is indicated in the preface, has been written, namely, for students preparing for the Preliminary Scientific Examination of the London University and the first Examination of the Conjoint Board. A great deal of ground has been covered, hence, in a few cases, the descriptions are of necessity very condensed. For example, in the reduction of copper oxide in hydrogen, nothing is said as to the need for displacing the air by hydrogen before commencing to heat the tube. Aqua regia is mentioned, but nothing is said about its composition. Fuller details of the methods for carrying out special tests, such as the borax bead test, would be advantageous. On the whole the book appears to be well adapted to the purposes for which it has been written.

Notes by the Way.

The French Congress Against Quackery.

It is to be feared that the Congress held recently in Paris with the excellent object of concerting measures for the repression of quackery attempted too much. It might almost be described as a case of "Much cry and little wool." The forms of illegal practice of the art of healing are manifold, and a legislative Hercules would be required to crush all the heads of the monster. It would be more business-like to deal with them singly. But it is to be feared that doctors do not always go to work in a business-like manner to obtain the reforms they think desirable. As Professor Brouardel gently hinted in his presidential address, the medical profession is itself, to a certain extent, responsible for the grievances under which it labours. It is loud and copious in complaint about the unfair competition of unlicensed practitioners, the defects of the law, and the unjust judges who administer it; but it appears to be unable to suggest practical remedies, or even to express its wishes in a form capable of embodiment in a legislative act. The lack of the qualities, which make up statesmanship, was as conspicuous in the Congress as it has so often been in reforming bodies nearer home. Summing up his impressions of the meeting, a French medical observer says: "The Congress wanted too much; it did not recognise with sufficient clearness the line of demarcation which separates that which it is possible to secure and that which doubtless will never be attainable." This is what has so often been said in THE PRACTITIONER, and it is most important that it should be fully realised by the medical profession.

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Resolutions of the Congress.

A VAST number of resolutions were passed by the Congress. It is impossible even to summarise them here, but a few of the principal ones may be mentioned. With regard to illegal practice by bonesetters, healers, touchers, sorcerers, etc., it

was resolved that the medical syndicates should take combined action by drawing up a statement setting forth the dangers caused by the practice of such quacks, and that the Minister of Public Instruction should be urged to place this statement on the programme of normal schools for teachers and primary schools. The opinion was further expressed that students should be instructed in a "truly practical manner" in the treatment of the most common injuries of the limbs. We hope that effect may be given to this excellent suggestion, for it can scarcely be denied that the method of dealing with such cases constitutes one of the *opprobria chirurgiæ*. With regard to massage and kinesitherapy (movement cure), the Congress passed a resolution that they should be practised only by legally qualified medical practitioners. As a corollary it was urged that instruction in these methods of treatment should form part of the official instruction given in medical schools. A resolution was passed that hairdressers and perfumers should be forbidden to sell lotions for the prevention of scurf, etc.: here we think the Congress erred through excess of zeal. The resolution passed not long ago by the Académie de Médecine that none but medical practitioners should use the X-rays or high-frequency currents for therapeutic purposes was endorsed by the Congress. A resolution against illegal practice by legally qualified persons was passed. It was aimed against the association of doctors with druggists for the "combined exploitation of the patient." As an example of this was cited the practice of writing prescriptions of drugs to be obtained only from a particular pharmacist. Consultation by correspondence begun through the sending out of printed schedules of questions was also condemned. An especially important resolution had reference to advertisements in the public press. It was proposed that non-medical writers of articles or advertisements in newspapers, or of pamphlets distributed to the public in which the symptoms, course and results of any disease were described and remedies recommended for the cure or relief of the condition, should be held guilty of illegal practice. The Congress further invited the General Association of French Practitioners to organise a system of anti-quack advertisement. This does not seem to be a very practicable proposition. The spectacle of quacks and

doctors advertising against each other would scarcely be edifying. So undignified a public contest could only benefit the quacks.

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Byron was surprised that—

Cheltenham Spa.

"The mind, that very fiery particle,
Should let itself be snuffed out by an article."

It is interesting to reflect that Cheltenham, as a spa, has suffered eclipse through a libellous epitaph. All the world knows it.

"Here lie I and my three daughters,
All from drinking Cheltenham waters.
If we had stuck to Epsom Salts,
We shouldn't be lying in these here vaults."

At a recent gathering in Cheltenham, it was pointed out that this epitaph had never been verified, and that, if it did exist, it wore on its own face the evidence of libel. For Epsom salts are represented in the Cheltenham magnesia water by 117 grains to the gallon. Indeed, the Cheltenham aperient water may lay claim to compare with any aperient water, and is not unlike the Quelle of Carlsbad, while the Cheltenham alkaline waters (Nos. 1, 2, 3 of the Pittville Spring) provide us with a source which will compare with Wiesbaden, Baden, Homburg and similar resorts.

The attractions of Cheltenham itself are well summed up in the motto of the town :—

"Salubritas et Eruditio."

The educational advantages offered by the boys' school and the young ladies' college supply "the eruditio"; while the "salubritas" of the smokeless city render it one of the most attractive resorts at home or abroad. Its detractors may say that the climate is relaxing, but a mildly relaxing climate, where the evenings and mornings are always fresh, has its advantages at certain ages, and in many conditions. Besides, on the city electric trams we can reach the top of Cleeve Hill in half an hour, and there the devotee of golf will have a four-mile sporting course at 1,000 feet above the sea. Over these Cotswold Hills and in the Severn Valley there are scattered some of the most picturesque villages, the most charming walks, and the most delightful resorts for the Archæologist.

Those who would know more on this should read *Cotswold and Vale* by Mr. Branch.

Cheltenham has been asleep to its own beauties for many years. Latterly it has been fortunate in finding itself possessed of a body of medical men who are as celebrated for their skill and enterprise as for their mutual good fellowship. By pulling together they have now the satisfaction of seeing the town equipped with the one thing needful. This was a well-furnished pump room. This magnificent building, recently erected, was formally opened by Dr. Goodhart on the 20th of June. The Central Spa is situated in the Town Hall, but, to all intents and purposes, the building is a magnificent casino, which can compare favourably with any similar erection on the Continent. The drinking room, the foyers, the reading rooms, music rooms, dancing rooms, terraces, etc., will certainly do much to revive the reputation of the Cheltenham waters, and one has only to study the chemical composition to see how favourable these waters are in this age of appendicitis, colitis, gastric atony, gall-stones, auto-intoxication, and similar ailments.

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The New Nurse in America.

SOME years ago THE PRACTITIONER ventured to point out some of the defects of the many fine qualities of the new nurse. Our remarks were not received in all quarters with that chastened spirit which should welcome the admonitions of a friendly critic, and we were accused of exaggeration and something worse. In particular we were taken to task by an eminent American journalist for (as he alleged) misrepresenting American professional opinion on the subject. It was, therefore, with considerable interest that a few weeks ago we read a report of a "symposium" on the training of nurses at the New York Academy of Medicine. Mr. George P. Ludlam, superintendent of the New York Hospital, said the calling of the trained nurse had been exalted into a profession, for which laws were enacted, and in which a title was conferred after graduation. Periodicals and volumes were devoted to the subject, and national and even international associations had been organised. All this marvellous growth had occurred in little more than a quarter of a century. He expressed

the opinion that the training school should be regarded as distinctly one of the departments of the hospital's work. Unfortunately, the present tendency was towards greater independence on the part of the school. Miss Mary A. Samuels held that the thoroughly equipped nurse should have some knowledge of anatomy, physiology, bacteriology, analysis of urine, radiology, hypodermolysis, and materia medica! Dr. W. Gilman Thompson said there was a feeling among a large number of physicians that the nurse of to-day was absurdly overtrained. The pseudo-scientific teaching prevalent in the schools was a mistake, as it left the pupil at the time of her graduation with only a smattering of knowledge on a multitude of subjects. He quoted a number of questions given at nurses' examinations and remarked that some of them would puzzle a doctor of medicine. Many bore on the treatment of disease, and he had known of instances where the overtrained nurses were so officious in the wards that the house staff had taken refuge in the clinical laboratory, leaving the patients to get along as best they might. What the community greatly needs, said Dr. Thompson, is a body of trained workers for simple cases. Dr. A. G. Gerster said he was entirely in accord with the views expressed by Dr. Thompson. The insistence on this "pseudo-scientific" curriculum was all the more reprehensible because it was totally unnecessary for the ends in view. Evidently the American profession finds the pseudo-scientifically trained nurse a being

> Too bright and good
> For human nature's daily food.

A person with a smattering of anatomy, physiology, bacteriology, analysis of urine, radiology, hypodermolysis, and materia medica, and the mental state which such a subject of undigested knowledge must engender, is not a nurse but a lower grade medical practitioner, and very badly trained at that.

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Oliver Wendell Holmes's Doctors.

If Oliver Wendell Holmes has a permanent place in the literary history, this will, we think, be due more to his delightful Breakfast Table Series and one or two of his poems than to his

novels. For ourselves, we confess we are repelled by *Elsie Venner*, while his two other stories, apart from the charm of style, which is never wholly absent from anything written by Holmes, arouse in us only a languid interest. But after reading a study of the doctors, who figure in his novels, by Dr. C. D. Spivak, which appeared not long ago in the New York *Medical Record*, we were tempted to read those stories again. The problem of the effects of parental and hereditary influence on the individual had a fascination for Holmes, and it is the *Leit-motiv* of *Elsie Venner* and *The Guardian Angel*. The third, *A Mortal Antipathy*, deals with the influence of a severe shock received in early childhood on a man's after life. It is not, however, the subject matter of the novels that concerns us here, but the pictures of the doctors who are incidentally introduced. They are all country doctors, and it is curious with what sympathetic insight Holmes, a University professor, who had passed all his life in a great centre of culture, understands the mental outlook and the difficulties and trials of the general practitioner. Here is a description of the life of a country doctor in America :— "Half a dollar a visit—drive, drive, drive, all day—get up at night and harness your own horse—drive again ten miles in a snowstorm—shake powders out of a vial (pulv. glycyrrhizæ, pulv. acaciæ āā partes æquales)—drive back again, if you don't happen to be stuck in a drift—no home, no peace, no continuous meals, no unbroken sleep, no Sunday, no holiday, no social intercourse, but eternal jig, jig, jig in a sulky, until you feel like the mummy of an Indian, who had been buried in the sitting posture, and was dug up a hundred years afterwards." The doctors are all of one type, kindly men, with more native shrewdness than book learning, but keen observers and sagacious in counsel.

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The True Healer.

Dr. Kettredge, in *Elsie Venner*, gives the following account of himself :—"I haven't got a great many printed books, and what I have I do not read quite so often as I might, I'm afraid. . . . When a man that's once right lives among sick folks for five-and-thirty years, as I've done, if he hasn't got a library of

five-and-thirty volumes bound up in his head at the end of that time, he'd better stop driving round and sell his house and sulky. I know the bigger part of the families within a dozen miles' ride. I know the families that have a way of living through everything, and I know the other set that have the knack of dying without any kind of reason for it. I know the years when the fevers are in earnest, and when they are only making believe. I know the folks that think they are dying as soon as they are sick, and the folks that never find out they are sick until they are dead. You can't tell a horse by driving him once, Mr. Langdon, nor a patient by talking half an hour with him." Dr. Kettredge always came into the sick room with a quiet cheerful look, as if he had a consciousness that he was bringing some relief with him. In regard to this matter Holmes has some wise words to say:—"The way a patient snatches his first look at his doctor's face, to see whether he is doomed, whether he is reprieved, whether he is unconditionally pardoned, has really something terrible about it. It is only to be met by an imperturbable mask of serenity, proof against anything and everything in a patient's aspect."

Of Dr. Butts, who appears in *A Mortal Antipathy*, we are told that "he had that sagacity without which learning is a mere encumbrance, and he had also a fair share of that learning, without which sagacity is like a traveller with a good horse, but who cannot read the directions on the sideboards." He was not a man who let himself be led astray by names. He knew well that what is spoken of as a "nervous disturbance" may mean that the whole machinery of life is disordered, and that each several organ would groan aloud if it had any other language than the inarticulate one of pain by which to communicate with the consciousness.

Dr. Spivak thinks it a pity that Holmes did not create a type of physician more worthy of his genius and of his profession. With this we do not agree, for we think he has given us the very "form and pressure" of the man in the gig driving along the rough country road in the rain, in whom, with Sir Frederick Treves, we see the truest type of the "beloved physician."

* * * * *

Epsom College.

Sir Constantine Holman's resignation of the Office of Treasurer of Epsom College, which he has held so long, is more of the nature of the fall of a dynasty than of the retirement of an official. For a score of years he has given himself heart and soul to the work of placing the charity and the school on a secure foundation. When he took the task in hand, drastic measures were necessary, and even a Hercules of reform might have hesitated at the sight of the stable he had to cleanse. Sir Constantine Holman, however, resolutely girded up his loins, and the powers of darkness and disorder soon flew before his vigorous broom. To him more than to any other man it is due that the school has been cleared from the taint of charity, and can now hold its own in point of teaching and equipment with the best in the country To him also more than to any one else it is owing that the funds available for benevolent purposes are administered at once liberally and economically. His loss to the institution on which he lavished such an increasing labour of love is irreparable. To those interested in the welfare of Epsom—as the whole profession should be—it will be some comfort that, as a member of the Council, his ripe experience and judgment will still be available for the benefit of the institution with which his name will always be associated. No man living has done the profession, of which he is one of the pillars in this country, better service; none has deserved better of the republic of medicine.

* * * * *

Competitions.

The result of the competitions for June is as follows:—The best essay was sent in by Dr. Hugh Barber, of Derby; and the best answer to the questions by Mr. A. Richardson, M.B., of Bristol. Cheques have accordingly been sent to these gentlemen.

Practical Notes.

THE CEREBRO-SPINAL FLUID.—This fluid plays the part of the lymph of the central nervous system, although it differs very considerably from all the other forms of lymph which occur in the body. The ventricles of the brain, which are continuous with the central canal of the spinal cord, contain the cerebro-spinal fluid. The roof of the fourth ventricle lies dorsally to the pons Varolii and medulla oblongata, and is covered in by a fine layer of pia mater, which is pierced by a small hole known as the foramen of Magendie. It is through this foramen that the cerebro-spinal fluid, contained in the canal and ventricles of the central nervous system, becomes continuous with the cerebro-spinal fluid, which is contained in the subarachnoid space of the brain and spinal cord. Cerebro-spinal fluid is chiefly formed in the lateral ventricles of the brain partly by a process of transudation from the fine capillaries of the choroid plexuses, which are vascular fringes derived from the pia mater, and partly as a secretion by the columnar epithelial cells which line the ventricles of the brain and the central canal of the spinal cord, and which are also reflected over the choroid plexuses. A slow formation of this fluid is in all probability always going on. Should any excess of it be produced, it may either escape along the sheath of the dura mater and the issuing nerve-roots, or, if the pressure of the cerebro-spinal fluid is higher than that in the neighbouring venous blood sinuses, it may leave the cranial cavity by filtering through the walls of these blood sinuses, and so get into the general venous circulation. The perivascular lymphatics of the brain are said to open into the subarachnoid cavity, and consequently to drain into the cerebro-spinal fluid.

The chief constituent of the cerebro-spinal fluid is water, but there are present very small amounts of globulin and inorganic salts similar to those, which occur in the blood plasma and lymph found in other parts of the body. It is interesting to note that the cerebro-spinal fluid contains the least amount of proteid when compared with that which is found in the

other liquids of the body. Gorup-Besanez states that there is only ·09 per cent. of proteid in cerebro-spinal fluid, whereas there is ·14 per cent. in the aqueous humour, 2·36 per cent. in pericardial fluid, 3·91 per cent. in synovia, and 3·94 per cent. in mllk. There is also a small amount of dextrose present, but quite enough to give Fehling's test for sugar, and it may be also demonstrated by the application of the phenyl-hydrazin test. This last-mentioned test may be performed as follows:—To about 7 c.c. of the cerebro-spinal fluid add 1 decigramme of phenyl-hydrazin hydrochloride and 2 decigrammmes of sodium acetate, then heat the test-tube in a water bath at 100° C. for half an hour; there will then appear a yellow crystalline precipitate, which, on microscopical examination, will be seen to consist of bundles of yellow needle-shaped crystals; these are crystals of phenyl-glucosazone. Cerebro-spinal fluid also contains a very small amount of an alkaloid called *choline*, which has the composition $[N(CH_3)_3C_2H_4O_2]$. It is derived from lecithin and protagon, both of which occur in the nervous system, and are constantly undergoing metabolic changes, breaking down and building themselves up afresh. These metabolic changes go on most actively in the neighbourhood of the grey matter of the brain and spinal cord.

Quincke's Lumbar Puncture.—For diagnostic purposes, and occasionally for treatment, the cerebro-spinal fluid may be withdrawn. The information furnished by this means is often of the greatest value. Osler says that "during the past ten years no single measure of greater value in diagnosis has been introduced." The method of performing the lumbar puncture is briefly as follows:—A stout antitoxin or exploring needle should be used, which ought to be about 2½ inches long for an infant, and 4 inches long for an adult, and should be previously boiled in a weak solution of washing-soda. The patient should be placed on the left side, and the spinous process of the fourth lumbar vertebra marked out. As a rule, a line drawn between the upper limits of the iliac crests cuts the vertebral column at the upper edge of the spinous process of the fourth lumbar vertebra. The skin in this vicinity should be thoroughly scrubbed with soap and hot

water, then washed over with alcohol, subsequently with ether; and after being allowed to dry, layer after layer of mercuric chloride lotion should be painted on, each layer being allowed to dry before the next is applied. The region should be covered with a piece of lint soaked in the lotion while the operator's hands are being thoroughly disinfected. It is well then to wash the skin over with alcohol in order to remove any excess of the antiseptic which may be present. The patient is next instructed to draw up his knees so as to flex his back, and at the same time to turn partly over on to his face. Next, the space between the spinous processes of the third and fourth lumbar vertebræ must be noted by the fore-finger of the left hand, and, if a local anæsthetic is to be used, the skin must be frozen just to the right of the middle line opposite to this position. When dealing with children, it may be necessary to administer a general anæsthetic. The sterilised needle is now taken in the right hand, held like a pen, and entered at a point level with the centre of the interspace between the third and fourth lumbar spines and a little less than $\frac{1}{3}$ of an inch to the right of the middle line. The needle is to be directed *forwards*, *slightly upwards*, and *slightly inwards*, and should be steadily pressed onwards. It not infrequently happens that the needle strikes against bone, it should then be withdrawn almost completely, and again pushed on after changing slightly its original direction. It is found that, if the patient is healthy, the cerebro-spinal fluid flows out slowly, drop by drop. If, however, the patient is suffering with meningitis, it comes out more quickly, or may even spurt out. Any condition causing a marked increase of intracranial or intraspinal pressure, such as a local new growth, may cause the fluid to spurt out with some force. The fluid may be collected in a sterilised tube. As a rule, from one to four drachms may be obtained in this way. It is well, however, to allow a few drops of the fluid to flow directly on to the surface of a culture medium without touching the glass. The fluid so collected should then be examined with the naked eye, for, in cases of meningitis, it is usually more or less turbid; if the fluid is quite clear there is presumptive evidence against meningitis, although, in cases of tuberculous meningitis, the amount of turbidity

may be very slight. Blood films, prepared after Jenner's method, should then be made, and the cytology of the particular cerebro-spinal under examination should be accurately determined. The chemical tests should then be proceeded with, the fluid should be examined for slight traces of albumen, which are normally present, tests should then be performed for sugar. As stated above, sugar (dextrose) is normally present; in cases of meningitis the sugar is either very considerably reduced or is altogether absent. Emery regards this as the most certain single sign of meningitis. The fluid should then be examined for various bacteria. The tubes, which have been previously inoculated by allowing the fluid to fall directly on to the surface of the medium, should then be put into an incubator at the body temperature for 24 hours. Streptococci, staphylococci, and pneumococci will in all probability have developed during this time, and will have formed distinct colonies. Weichselbaum's diplococcus, which is the cause of cerebro-spinal fever, forms on blood-serum "round, whitish, shining, viscid-looking colonies, with smooth, sharply-defined outlines, which attain a diameter of one to one and a half millimetres in 24 hours." If there are no colonies found upon blood-serum or agar at the end of 48 hours, the meningitis is probably due to the tubercle bacillus or the gonococcus. It has been found that, in some cases of cerebro-spinal fever, the diplococci in the cerebro-spinal exudate are all dead, and the cultures therefore remain sterile. For a more detailed account of the method of performing the lumbar puncture, and the full interpretation of the results obtained, together with a complete account of the cyto-diagnosis, the reader is referred to Emery's *Clinical Bacteriology and Hæmatology*,[1] which has recently appeared in a second edition, and which has been specially written for practitioners. When pressure symptoms are marked, as in cases of hydrocephalus, Quincke's lumbar puncture may be resorted to, and cerebro-spinal fluid withdrawn from the subarachnoid sac between the third and fourth lumbar vertebræ. Here, of course, the spinal cord cannot be touched, but the advantages

[1] *Clinical Bacteriology and Hæmatology for Practitioners.* By W. D'Este Emery, M.D., B.Sc. (Lond.), Clinical Pathologist to King's College Hospital, and Pathologist to the Children's Hospital, Paddington Green, London. Pp. 240, 10 plates. London: H. K. Lewis. 7s. 6d. net.

are a slower removal of fluid, and less danger of collapse, than if the lateral ventricles of the brain had been tapped.

The lumbar puncture has been performed in some cases of acute diffuse lepto-meningitis, a disease which is always of an infective nature; in no case, however, so far, has a successful result followed, for, as a rule, the subarachnoid space is divided into separate cavities by the organisation of lymph which has been exuded from the region of inflammation, and it is obvious that a single lumbar puncture cannot possibly drain these separate cavities. Moreover, in acute diffuse lepto-meningitis, the small foramen of Magendie is certain to be blocked with lymph, thus disturbing the exudation which normally takes place there from the fourth ventricle into the adjacent subarachnoid space.

KERNIG'S SIGN.—Amongst the special diagnostic features of cerebro-spinal fever is Kernig's sign. "When the thigh is flexed at right angles to the abdomen, the leg can be extended upon the thigh nearly in a straight line. If meningitis be present, strong contractures of the flexors prevent the full extension of the leg on the thigh." In order to test for Kernig's sign, the patient may be propped in bed in a sitting posture, or the test can be equally well made in the recumbent position. Netter's explanation of the phenomenon is that "in consequence of the inflammation of the meninges, the roots of the nerves become irritable, and the flexion of the thighs upon the pelvis, when the patient is in the sitting posture, elongates and consequently stretches the lumbar and sacral roots, and thus increases their irritability. The attempt to extend the knee is insufficient to provoke a reflex contraction of the flexors while the patient lies on his back with the thighs extended upon the pelvis, but it does so when he assumes a sitting posture."

TREATMENT OF CEREBRO-SPINAL FEVER. — Aufrecht recommended that hydrotherapy, in the form of the tub bath at 98° F., should be systematically used, and, if necessary, it may be given every third hour. If convulsions, or coma, are present the lumbar puncture should be resorted to, in order that pressure may be relieved. Hypodermic injections of

morphia may be used to relieve pain and spasms, and to procure sleep, at the same time they help to relieve the vomiting. In mild cases, potassium bromide may be employed, and the following combination will be employed useful:—

℞ Potassii Bromidi - - - - gr. xv.
Potassii Iodidi - - - gr. x.
Syrupi Aurantii - - - - ʒss.
Aq. Dest. - - - - ad ℥i.
Misce. Ft. Mist.

The mixture may be given twice or three times daily, before food is taken.

If spasms are continuous and the above remedies fail to relieve them, a combination of morphia and atropine will be efficacious. Recently good results have been reported after the administration of phenazonum (antipyrine) in doses of five to ten grains three times daily.

The vomiting may be relieved by an effervescing saline draught, containing two minims of acidum hydrocyanicum dilutum and three grains of sodium bromidum.

The diet should consist of milk, broth, clear soup, and, if there is evidence of cardiac weakness, brandy should be administered.

During convalescence, which is usually remarkably protracted and associated with emaciation and debility, tonics will be required, such as quinine and iron compounds.

PHOSPHATIC URINE.—In the *St. Bartholomew's Hospital Journal* for April of this year, Dr. Samuel Gee writes:—"Nothing is more easy than to render the urine alkaline by the use of drugs; but to make neutral or alkaline urine acid, by drugs or diet, is difficult or even impossible. Urine of deficient acidity, and, therefore, turbid with earthy phosphates, is, fortunately, a condition which is temporary, and does the patient no harm, when there are no other signs of disease. It is a mistake to say that such a patient is passing an excess of phosphoric acid unless repeated volumetric analysis has proved that this is so. These persons tend to become hypochondriac when their attention has been drawn to the state of their urine."

Novelties and Notices.

EVANS' WATER STERILIZING TABLETS.

(Messrs. Evans Sons, Lescher & Webb, Ltd., London.)

When the excessive mortality arising from the use of impure drinking water during the late South African War is remembered, the desirability of adopting some process for the sterilization of water must be clearly apparent. Captain Nesfield, F.R.C.S., has invented and patented such a process, by means of which the destruction of bacteria in water is rendered easy and rapid. The process consists of liberating free iodine from a tablet in solution marked "A" by means of the addition of a tablet marked "B." The iodine, which is a very powerful germicide, is then removed by the addition of a third tablet marked "C." The interaction is as follows :—

$$A - 5\,NaI + NaIO_3 + "B" = 2H_3\,C_6H_5O_7 = 3\,I_2 + 2\,NaC_6H_5O_7 + 3\,H_2O.$$

This iodine solution is stirred into the water and, after the lapse of two minutes, the sulphate tablet "C" is added, the result of which is that the iodine at once disappears, leaving the water sterile, clear, and tasteless. The successful nature of the process was abundantly proved in the recent Tibet Mission. All the men who drank of the purified water escaped infection, while the incidence of cholera and dysentery amongst the others was great. The process is inexpensive, as 8 gallons of water can be sterilised for three halfpence.

TABLOIDS.

(Messrs. Burroughs Wellcome & Co., London, Sydney, and Cape Town).

Argyrol. — "Tabloid" Ophthalmic Argyrol, gr. $\frac{1}{24}$ (·0027 grm.).

"Soloid" Argyrol, gr. 1 (·065 grm.).

Five to 50 per cent. solutions of argyrol, which is an organic silver compound, strongly antiseptic and non-irritating,

are used in purulent and gonorrhœal ophthalmia, and in lachrymal obstruction. In gonococcal urethritis, injections of a 5 per cent. solution, gradually increased in strength, are recommended. The solution of Argyrol penetrates the tissues without causing a superficial coagulum. It is, therefore, of importance in gonorrhœa, as the solution destroys the gonococci in the deeper tissues. The "Tabloids" are issued in tubes of 25, and the "Soloids," of gr. 1, in tubes of 12; those of gr. 5·45 (·353 grm.) in tubes of 6.

ÆDUN BREAD.

(The Patent Ædun Flour Company, Ramsgate, Kent.)

This patent bread is offered to the public as more nourishing than either white or brown bread, much nicer and more digestible. The deficiency of albumenoids and phosphates in ordinary wheaten flour is remedied in this Ædun Bread by the introduction of other food grains which contain them. The bread is very palatable, and is especially useful for invalids and for those with weak digestion.

COFFEE, COCOA AND CHOCOLATE WITH MILK.

(Messrs. Fussell & Co., Monument Street, London.)

In these days of hurry and rush, when time is so valuable, few preparations are more useful than the above, which have been put upon the market by Messrs. Fussell & Co. They are guaranteed to be manufactured from the best materials, and the statement may be accepted in good faith. They are prepared with either full cream or the best condensed milk, and on that account contain a large percentage of useful fat. To those who enjoy a cup of really good café au lait, or a more nutritious cup of cocoa or chocolate with the best milk, these palatable and mildly stimulating beverages will specially commend themselves.

COMPETITIONS.

We offer our readers every month two Prizes on the conditions stated below.

A Prize of Two Guineas will be given to the author of the best Essay on a subject to be announced by the Editor.

A Prize of One Guinea will be given to the author who submits the best account of three cases, medical, surgical, or obstetrical, taken from the practitioner's own note-book. The style of the account, as well as the medical interest of the cases, will be taken into consideration.

Results of the July Competitions will be announced in the September number.

The Subject of the Essay for August will be

The Ætiology, Pathology, Symptoms and Treatment of Infantile Paralysis.

GENERAL CONDITIONS.

A.—All MSS. relating to the Essay must be marked on the top left-hand corner "Essay," and must be sent to the Editor of The Practitioner, 149, Strand, W.C., on or before the 1st day of September 1906.

B.—All MSS. relating to the cases must be marked on the top left-hand corner "Cases," and must be sent to the Editor on or before the 1st day of September, 1906. The matter submitted must not exceed three hundred words for any one case.

C.—No Essay will be returned unless a special request is made, accompanied by a stamped addressed envelope.

A and B.—(1) One side of the paper only must be written on.

(2) The name, or pseudonym, and address of the competitor must be clearly written on each sheet of paper used.

(3) The decision of the Editor is final.

(4) Competitors must be registered General Practitioners.

(5) The attached Coupon must be filled up by each competitor.

THE PRACTITIONER.

SEPTEMBER, 1906.

ANGINA PECTORIS.[1]

By G. A. GIBSON, M.D., Sc.D., LL.D.
Physician to the Royal Infirmary, Edinburgh.

My first duty is to give expression to the natural feeling of gratification which has been aroused in my mind by the flattering invitation conveyed by the kindness of my friend and your teacher to address you. Such international courtesies seem to me of great value from every point of view. Intercourse with observers in other countries enlarges our knowledge, while it widens our sympathies, and the solidarity of modern science is increased by free interchange of ideas. To myself it is an honour, as it is a pleasure, to be requested to visit your interesting country, with which my own has for many centuries had close bonds of union. Such feelings are certain to arise in the mind of anyone belonging to an academic circle, especially when connected with Edinburgh. For many years the illustrious Hermann Boerhaave has been one of my medical heroes, and it is a matter of the greatest interest to remember that, when he was an undergraduate at Leyden, the celebrated Archibald Pitcairne was Professor of Medicine in that famous University. That my distinguished fellow-countryman should have played the part of Mentor to the Telemachus of your still greater compatriot is certainly a matter of deep interest to us in the British Isles.

These reflections, however, take us back to the period when scientific medicine was only in its dawn; in our own era there are abundant reasons for vivid interest in the medical world of the Netherlands. To anyone who, like myself, has been engaged for years in the study of circulatory phenomena, your country holds out some names of world-wide fame. It is only necessary to mention the exhaustive physiological

[1] An address delivered in the Medical Clinique of the University of Groningen.

investigations of Engelmann, Hoorweg and Einthoven, which have added new lustre to the ancient universities which they have adorned, and the illuminating clinical researches of Stokvis, Wenckebach and van den Bergh, which have crowned your medical schools with imperishable laurels. Above all, my friendly relations with your own distinguished teacher render my appearance on this occasion particularly gratifying.

The subject to which my attention has been requested for this lecture is angina pectoris, especially in the light of some recent extensions of our knowledge of the affection. Before entering upon the consideration of the subject, let me mention the singular fact that angina pectoris appears to be much less common in the Netherlands than in the British Isles. Professor Wenckebach informs me that this is the case as regards every variety of the condition. It is not easy to account for this difference in distribution. The inhabitants of the two countries are certainly blood relations in a very close degree. Both nations are endowed with a great amount of energy, mental and physical, and their habits are not widely dissimilar. The use of tobacco is at least as great on the east side of the North sea as on the west, and the inhabitants of both countries imbibe freely of alcohol; it seems to me, nevertheless, that in the abuse of alcohol my countrymen are greater enemies than you are, especially north of the Tweed, where—to borrow the sardonic phrase of rough old Samuel Johnson[1]—the people are "without skill in inebriation."[2] In saying this, I am undoubtedly in antagonism to the opinion expressed by the ingenuous Burton.[3] Nevertheless, it seems to me that the opinion which has just been expressed is correct. Again, in both countries hard work is the general rule. Possibly the strenuous life has more followers in the United Kingdom than in the Netherlands. When we give full weight to all these considerations, it must be allowed that no sufficient

[1] Boswell: *The Life of Samuel Johnson, LL.D.* Edit. 1826. London. Vol. III., p. 370.

[2] It is probable that the oppressive sumptuary regulations, under which we labour in our northern kingdom, have much to do with the deplorable results which we see, and it cannot be gainsaid that recent experiences in the Modern Athens prove that the extent of drunkenness, with its attendant evils, is directly proportional to the stringency of our licensing laws.

[3] *The Anatomy of Melancholy*, viii. Edit. 1676. London. Part I., section 2, number 2, subsection 2, p. 44.

reason can be adduced for the comparative immunity of your fellow countrymen from angina pectoris.

My remarks upon this interesting subject will be mostly clinical, and will be especially directed, in accordance with the request which has been made to me, to some symptoms which have recently attracted my attention for the first time. It is inevitable that some reference must be made to the ætiology and pathology of the conditions underlying the complex of symptoms we have to consider, but this will be done as briefly as possible.

The great fact in angina pectoris is the existence of pain, or some analogous subjective result of sensory disturbance ; around this predominant symptom the attendant phenomena are variously grouped. The uneasy sensation has its principal seat in the præcordia, and usually, but not invariably, extends thence in different directions. Most typically it radiates towards one or both of the shoulders and arms—to the left, when the cardiac disturbance is mostly connected with the left side of the heart ; to the opposite side when the right heart is chiefly involved ; to both sides if the heart is bilaterally affected. Very frequently the discomfort affects the region of the angle of the scapula, where indeed it sometimes seems to attain its greatest intensity. The pain often reaches the fingers, affecting especially the ring and little fingers of the left hand. Sometimes but not nearly so often, it extends up the neck to the back of the head, and occasionally it may pass down to the trunk and even reach the toes of one or other of the lower extremities. We shall afterwards see the reason for such facts of distribution, but let me in this place mention, in passing, that the pain of biliary colic and renal colic, and even of pulmonary congestion or hepatic congestion, has the same tendency to radiate.

The character of the uneasiness and the intensity of the suffering vary enormously. Time would fail me to give you details of the different varieties which are presented ; suffice it to say in a single word that there is a complete gradation from vague uneasiness to intolerable anguish.

As regards the occurrence of the chief symptom, one of its predominant characteristics is the paroxysmal mode of onset. The first attack has undoubtedly often proved fatal, but it is

common to find repeated paroxysms separated by intervals absolutely free from symptoms; in almost every case, however, the patient has constant uneasiness varied by attacks of greater severity. An important point is that the paroxysms are apt to be induced by exertion, whether muscular, intellectual, or emotional, as well as by digestive conditions. We must not make too much of this generally recognised fact, however, for many cases are on record, in which the symptoms have been most urgently present during the night. Although a certain amount of weight must be allowed to the commonly accepted belief that the incidence of an anginous attack after effort of any kind is significant of the graver varieties of the affection, there are, nevertheless, so many exceptions that any rule based on such a conception would be as unwise as it would be misleading. Many other subjective sensations attend the painful feelings, such as faintness and giddiness, tightness and breathlessness, weakness and unsteadiness. The prospect or impending death has been recognised since the early days of our knowledge of angina pectoris, and certainly it is often met with. Many of these sensations can be modified, or even removed, by change of posture and by deep inspiration, but at times the influence of the subjective disturbance is so overwhelming as to prevent any efforts of either kind for fear of increasing the distress. It is generally found that, when the sufferer takes his courage in both hands and alters his position, or draws some deep breaths, he to some extent relieves his symptoms. Patients occasionally complain of weakness of the muscles on the affected side, and this weakness is necessarily found chiefly in the muscles of the upper extremity; they further complain occasionally of tenderness over the areas to which subjective pain is referred. To both of these points further reference will be made.

Turning to the objective aspect of angina pectoris, it may be said that the general appearance of the patient may present the widest variation. From deathly pallor to intense cyanosis; showing an attitude of statuesque immobility, or contortions of intolerable agony; with the skin dry and shrivelled, or with the surface bedewed with drops of perspiration; having an expression which may betoken lively curiosity or gloomy apprehension—patients manifesting all these appearances have

been seen by those of us who have had the misfortune to see much of this fell disorder. The wide divergences observed cannot be matter for wonder, seeing that the affection is variable in its severity, and the characteristics of the sufferer may be widely different. On closer examination, the pulse is found to yield information of the most widely divergent kind. The arteries may be healthy or sclerosed; the pressure may be low or high; the rhythm may be regular or otherwise; and the rate may be diminished or increased. In regard to these matters, it is probable that some discrepancies which have occurred are due to difficulties of observation, seeing that the physician necessarily abstains as much as possible from disturbing a patient during a period of suffering. But it has fallen to my lot to be able on many occasions to measure the pressure accurately with the sphygmomanometer, and even to take tracings with the sphygmograph during an attack, and the varieties just mentioned have all been recorded.

At times the veins of the neck may be seen standing out like knotted cords, or wildly pulsating, but in the cases based upon aortic valvular lesions, the arterial pulsation dominates all the cervical features. There is often evidence on inspection, palpation, and percussion, of increase in the size of the heart. The sounds may be largely obscured by murmurs, particularly in those cases of aortic valve disease just referred to. But at other times they are clear and ringing, or low and muffled, according as dilatation or hypertrophy is in the ascendant. Undoubtedly there is evidence in many cases that the heart is struggling to overtake an obstacle, and frequently of its failure to do so. Over the painful areas there is usually hyperæsthesia, the importance of which has been so thoroughly shown by Mackenzie[1] and Head.[2] It may be tested by every means which we employ for the estimation of sensibility, and is almost invariably found to show exaltation to every kind of stimulus. But a different state of matters occasionally prevails. After hyperæsthesia has existed for some time it is succeeded by anæsthesia, which, like the preceding exaltation, is found as regards all kinds of stimuli. Very often there is tenderness of the intercostal and cervical muscles with contraction.

[1] *Medical Chronicle*, 1892, Vol. XVI., p. 293; and *Lancet*, 1895, Vol. I., p. 16.
Brain, 1893, Vol. XVI., p. 1; and 1894, Vol. XVII., p. 339.

During recent years several instances have been under my notice in which there were further objective appearances of reflex disturbance brought about through the nervous system. To some of these, confessedly rarer than the symptoms just mentioned, attention was directed by me during last year.[1] Prominence of the left eyeball, with retraction of the eyelid, and dilatation of the pupil, were seen by me recently in a most interesting patient. In this case, along with intense hyperæsthesia over the left half of the chest and the outer aspect of the left arm, there was absolute anæsthesia of the radial half of the hand, both on the palmar and dorsal aspects. There was also weakness of all the muscles of the left arm and forearm, particularly of those on the outer and radial sides. All the muscles affected were flabby in tone; the power of grasping was almost entirely lost; but the muscular response both to mechanical and electric stimuli was increased. On measuring the muscles they were considerably reduced in size. Since the publication of my interesting case a remarkable instance of angina pectoris, with lichen planus over the area of distribution of the intercosto-humeral nerve, where the pain was situated, was described by Gasne and Chiray.[2] As is well known, the secretions often undergo modification. An abundant flow of urine is common, and increase of saliva is at times also observed.

To have a basis for the explanation of these widespread symptoms, we must turn briefly to the nervous connections between the circulatory organs and the nerve centres. The afferent impulses passing to the centres in connection with the inhibiting and dilating mechanism proceed by way of the vagus nerve. The afferent impulses of the accelerating and constricting mechanism have their course by the inferior cardiac nerve to the inferior cervical ganglion, and thence by the grey rami to the seventh and eighth cervical segments of the cord, whence they pass by the annulus of Vieussens to the upper thoracic segments. There is, however, no experimental proof of afferent nerves arising in the heart and reaching the spinal cord. Judging afferent nerves of the visceral system by those belonging to the abdomen, they are always medullated up to

[1] *Brain*, 1905, Vol. XXVIII., p. 52.
[2] *Gazette des Hôpitaux*, 1905, p. 463.

the posterior ganglion. It might reasonably be expected that the afferent cardiac nerves must also be medullated; but the nerves between the heart and the annulus of Vieussens are non-medullated. It is probable that the spinal heart nerves are a special example of the vaso-constrictor nerves, and, if the blood vessels possess afferent nerves, the heart, in virtue of its connection with the vaso-constrictor system, must have such nerves. There is evidence of the possession of spinal afferent nerves by the blood vessels, although there is no proof that the blood vessels have any medullated fibres. On the whole it is probable that afferent nerves connected at least with the coronary vessels should accompany the accelerator, and thus account for the clinical facts.

Passing from the receptive end organs, whether of the heart or of the great vessels, by the cardiac nerves to the cervical ganglia of the sympathetic, the impulses enter the spinal cord by the grey rami communicantes, and thence run upwards in the ascending tracts of the spinal cord. In the cortex cerebri the effects produced give rise to sensation, but, as Head[1] puts it, "the sensory and localising power of the surface of the body is enormously in excess of that of the viscera, and thus, by what might be called a psychical error of judgment, the diffusion area is accepted by consciousness, and the pain is referred on to the surface of the body instead of on to the organ actually affected." The result in angina pectoris is that the patient feels uneasy or painful sensations over the præcordia, shoulder and upper extremity. In the interesting case which has been described there can be no doubt of the fact that the cervical sympathetic nerve is involved. The ocular phenomena are sufficient to prove this, and the phenomena furnish conclusive evidence of the contention that the sympathetic system provides the means of conducting afferent impulses from the heart. The afferent impulses in this case reaching the inferior cervical ganglion have undoubtedly separated at that point and taken two different paths, one, as already mentioned, proceeding up by means of the spinal cord to the cerebrum, while the other has passed up the gangliated cord through the middle into the superior cervical ganglion, whence fibres pass to the unstriped fibres of the

[1] *Op. cit.*, Vol. XVI., p. 126.

levator palpebræ superioris, to the muscle of Müller, and to the radiating fibres of the iris, accounting for the elevation of the eyelid, the protrusion of the eyeball, and the dilatation of the pupil.

The causes of the impulses, whose course has been traced, are certainly numerous. Aortic, coronary, and myocardial lesions lead to secondary changes by interfering with the nutrition of the heart muscle. This may occur either by diminution of the blood supply, long ago suggested by Allan Burns,[1] or by direct irritation of the sensory nerve endings. Pericardial affections, aneurysms, and tumours occasionally produce symptoms like angina pectoris; but they are, as a rule, not so definite. Further, there can be no doubt that cardiac stress, leading to strain, originally mentioned by Cahen [2] and Eichwald,[3] may, in the absence of distinct structural alterations, produce a considerable degree of cardiac pain. A recent paper of Mackenzie's [4] gives a most excellent summary of our present knowledge of this aspect of the subject. He concludes that angina pectoris will, in all probability, be found to depend upon impairment of the function of contractility. Toxic influences can easily be understood as factors giving rise by irritation to considerable discomfort. Reflex action, taking its origin even in the most distant parts of the body, is by no means an uncommon cause of cardiac pain, acting, as it does, by increasing the strain on the heart. In this connection, it may be added that Russell [5] lately, in a very interesting paper, described the relation of angina pectoris to reflex action of abdominal origin. Vasomotor, neurasthenic, and hysterical causes are much less common, excepting in association with structural alterations, with which they are sometimes conjoined. It is not possible to leave this subject without referring to the views of Clifford Allbutt,[6] who believes that the essence of angina pectoris is to be found solely in aortic lesions. This is to my mind too narrow a conception of the state of matters. Lastly, let me

[1] *Diseases of the Heart*, 1809, p. 138.
[2] *Arch. gén. de méd.*, 1863, pp. 428, 561, and 696.
[3] *Würz. med. Zeitschr.*, 1863, s. 249.
[4] *Brit. Med. Journal*, 1905, Vol. II., p. 847.
[5] *Brit. Med. Journal*, 1906, Vol. I.
[6] *The Cavendish Lecture*, London, 1903, p. 17

add that the blood pressure may be high, as originally proved by Brunton,[1] or low, as was first demonstrated by Morison,[2] but in the largest proportion of cases the pressure is high in relation to the strength of the heart.

Passing by all questions of diagnosis as well as of prognosis, let me say a few words as regards the treatment of angina pectoris. The first point, which will always demand consideration, is whether there are any underlying conditions inducing or influencing the symptoms. In particular it is always advisable to investigate the condition of the abdominal viscera, seeing that catarrh of the mucous membrane and distension of the visceral walls are so often the reflex causes of attacks, while dilatation of the stomach and intestines is sometimes also a direct mechanical source of disturbance. Similarly when the pulmonary circulation is interfered with, so as to increase the stress upon the right side of the heart, there are apt to be some distressing results. On the other hand, any diminution of excretion, by skin or kidney, leads to troubles for the left side of the heart, through increase of blood pressure. Each and all of these possible factors must be thoroughly investigated. Again, the amount of exertion, physical and mental, should be carefully estimated. All deviations from healthy conditions must be obviated or relieved according to circumstances, both as regards immediate results and further contingencies.

Our first duty, when called to see anyone suffering from a paroxysm of angina pectoris, is to relieve it with as little delay as possible. Seeing that in the majority of cases the condition is associated with at least a relative high arterial pressure, drugs which lessen the resistance are of great importance. The most useful of these are the nitrites and the iodides. The nitrites of amyl and butyl—more exactly isoamyl and isobutyl—have long had a well merited vogue for relieving the symptoms. Amyl nitrite is pre-eminently useful, and, when administered in a dose sufficient to produce well marked physiological effects, it cannot be surpassed. Butyl nitrite, although of more recent introduction, and therefore of less assured utility, appears to produce very beneficial effects also.

[1] *Lancet*, 1867, Vol. II., p. 97.
[2] *Edin. Hosp. Reports*, 1895, Vol. III., p. 250.

Both may be administered in doses of from three to five minims, the most convenient means of administration being glass capsules. It is difficult, if not impossible, to decide *a priori* the relative utility of these drugs. Their effects are undoubtedly dependent to a great extent upon personal idiosyncrasies.

Ethyl iodide, otherwise known as hydriodic ether, is also of considerable value, administered by inhalation in doses of five minims; glass capsules containing this dose may be employed. So far as can be ascertained, the action of this drug is due to the liberation of free iodine, which is rapidly absorbed by the blood. It is impossible to foretell in any given case whether the nitrite or iodide series will be most useful, and the value of these drugs can only be judged by their results. It is unfortunate that all of them frequently leave headache and giddiness behind them. A very serviceable combination is supplied in capsules of ethyl iodide and chloroform, each containing five and ten minims respectively of the two drugs. The chloroform has certainly, in my own experience, lessened the discomfort produced by hydriodic ether.

The exhibition of powerful alcoholic stimulants by the mouth is often urgently called for; brandy, whisky, spirit of ether, spirit of chloroform, and aromatic spirit of ammonia are all eminently useful in this connection. It may even be necessary to give the patient such general anæsthetics as chloroform or ether by inhalation. Sometimes the subcutaneous administration of morphine is absolutely necessary. The application of heat to the chest externally is often useful, and respiratory movements certainly alleviate the suffering in many cases. It need hardly be added that the patient must be placed in such a position as will be most easy and comfortable, while an abundant supply of fresh air must be secured. If the sufferer can be induced to inspire deeply, he will often obtain relief.

When we consider preventive treatment, we find it necessary to lay down full directions regarding the general measures to be followed. The diet must be so regulated as to prevent any digestive embarrassment, particularly flatulent distension; the fluid must be ample, so as to ensure proper metabolic changes, but it should not be given with meals;

sufficient exercise must be enjoined, so as to stimulate not only the muscles but every other part of the body; adequate rest should be secured, so as to provide for recuperation; occupation must be provided, in order to prevent the mind lingering upon the distressing symptoms of the affection; sleep enough to provide for complete restitution of every system will have to be ensured—these general measures will require full attention, and many little details, which cannot be mentioned here, will demand sedulous care.

Respiratory movements cannot be over-estimated; their value for those able to take advantage of them is very great. In certain cases, however, when the patient is unable to take active exercise, massage must be adopted. With regard to such matters, you will allow me to express my own conviction that the Swedish system of massage and exercises is very much more useful than any other method.

In dealing with the medicinal treatment of angina pectoris, it has to be remembered that, with a complex causation, there must be considerable difference in management. As regards organic types of the affection, it may be necessary to use remedies which will modify metabolism, and act as alteratives; amongst such drugs there are none to compare with the iodides. Undoubtedly the efficacy of these drugs is entirely due to their power of removing morbid products. Iodide of potassium and iodide of sodium are the most useful of these remedies, and one or other may be combined with arsenic, both to prevent the tendency to iodism, and to obtain the specific influence of arsenic itself. If these iodides cannot be tolerated, as occasionally occurs, hydriodic acid, in the form of the syrup, may be administered.

If the pulse pressure has a tendency to be relatively too high, one of the vaso-dilators should be administered; nitro-glycerin is the most valuable of all these. It may be given in a dose of from $\frac{1}{200}$ to $\frac{1}{50}$ gr. The 1 per cent. alcoholic solution and the tablets afford easy methods of administration. The drug, if necessary, may be given hypodermically; the preparation most commonly used being 25 minims of the trinitrin solution, with 10 minims of 90 per cent. alcohol, and 25 minims of distilled water; of this from 1 to 4 minims may be administered hypodermically for a dose.

Erythrol tetranitrate, or tetranitrin, is often used in doses of from ½ to 2 grs., while manitol pentanitrate, or pentanitrin, and mannitol hexanitrate, or hexanitrin, have been used in recent years, in the same doses as we use in the case of nitroglycerin; they are, however, not to be compared with it.

In all cases where the heart shows any tendency to falter, or in which it is relatively weak compared with the pressure it has to overcome, the management will necessarily be to all intents and purposes that of cardiac failure; sufficient rest with graduated exercises and such cardiac tonics as strophanthus with nux vomica are to be recommended. In the toxic cases of cardiac pain, the elimination of the poison, the restoration of the cardiac energy and the recovery of the nervous system are the points to be borne in mind. In the case of chemical poisoning, whether due to alcohol, tobacco, or tea, further enjoyment of the poison must be prevented. In such cases a considerable lapse of time is necessary, and continued rest with massage, succeeded by respiratory exercises, and followed by graduated exertion will be necessary.

Practically the same line of treatment is necessary in gouty conditions, but the specific for such states is colchicum, which, along with alkalis, will speedily bring about improvement. In instances of influenzic or diphtheritic angina, the best treatment undoubtedly is the same as has been suggested for the chemical poisons. In some cases the use of appropriate baths is indicated; along with such means the employment of strychnine promises the best results.

In order to remove reflex angina pectoris, the cause of the disturbance must be ascertained, while at the same time the bromides or hydrobromic acid will lessen reflex irritation. The vasomotor type of the affection is best treated by means of the nitrites, but thyroid extract has, in my hands, produced considerable improvement in cases manifesting symptoms like those of Raynaud's disease.

Lastly, the neurasthenic and hysterical varieties must be dealt with as part of the general conditions in which the symptoms arise, and the modern treatment of such conditions produces, as a general rule, most satisfactory results.

AN IMPROVED METHOD OF PUTTING UP FRACTURED CLAVICLES.

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The method of putting up fractured clavicles, suggested by Dr. Sayres, of New York, by means of two strips of adhesive plaister has supplanted all other appliances in general use. It was a great advance in efficiency, and some in comfort for the patient, but leaves much to be desired by patients, and by those who have to look after these cases.

In the *Medical Review* for January 1899, an illustrated note was published of a suggestion by Dr. Henson (*Georgian Medical Journal*, November 1898), to substitute for part of the strapping two pieces of jean or other stout material (for the shoulder and elbow), retaining the plaister strip, which is used in Sayres' method to draw back the upper arm.

In the spring of 1900, I had an opportunity of trying this plan, and found that the elbow-piece, as suggested by Dr. Henson, is uncomfortable and difficult to manage, and that it was desirable, if possible, to get rid of the strapping. After some trouble, I succeeded in getting an elbow-piece made which is efficient and comfortable. For the strapping I have substituted a band of webbing, which is not only cleaner, but also completes the apparatus in a manner which I shall explain later on.

The apparatus, as now made for me by Messrs. Down Brothers, consists of three parts: a shoulder-piece, which is practically half of a short waistcoat, an elbow-piece, and the webbing to draw back the upper arm. All are interchangeable from side to side. The first two are made of jean, and the webbing is similar to that used for babies' binders. The accompanying sketches show better than words how the apparatus is applied.

First the shoulder-piece is fitted on the uninjured side, taking care that the loop to support the hand comes in front; a pad is then placed in the axilla, and the arm-piece is tied

on round the arm as close up to the axilla as possible, the two free tapes at the end being loosely tied to the *lower* two

Fig. I. *Front.*

Fig. II. *Back.*

tapes on the back of the shoulder-piece; lastly, the elbow-piece is put on, the two tapes behind being tied to the *upper* two on the back of the shoulder-piece, whilst in front, the arm having been placed in the usual completely-flexed position, with the hand well up on the whole shoulder, the loop is buttoned over the wrist, the upper tape is passed through the small loop opposite to it on the elbow-piece, and tied to the uppermost one on the shoulder-piece; the adjustment of the last two pairs of tapes is now obvious, and it will be found that the arm on the injured side is fixed in good position, and that all that now remains is to tighten up the tapes.

A little consideration will show that there is now a line of traction passing from the elbow completely round the chest to the upper arm, any shortening of which pulls the elbow forwards, and the shoulder back; whilst, by tightening the posterior attachments and upper anterior tape of the elbow-piece, the whole weight of the arm is slung, and the shoulder can be considerably raised. There is some constriction of the chest which checks, to some extent, thoracic breathing, an end not undesirable in itself, since it is the movement of the inner end of the clavicle caused by respiration which makes it impossible to secure complete immobility of the bone.

In quite young children, in whose cases, I believe, the accident is rare, there is no satisfactory method of putting up fractured clavicle. I have had two cases, aged 2 and 3 years respectively, and found that neither this appliance nor any other, except simple bandages, was of any use, because, after the first few days, there was no pain, and the children wriggled out of everything. In the case of ladies, in whom the deformity of anything but perfect union might show, perhaps the safest method is still to keep the patient in bed with sandbags on the shoulders; but this is a tedious arrangement, and very seldom necessary or submitted to. In all other cases, the appliance I have described above will, I am sure, be found a great improvement on anything that has been available up to now. It is clean; there is no risk of dermatitis; it is a great economy of time for the surgeon, for the re-tying of a tape or two is much more quickly done than the application of much strapping, and also, if the patient lives at a distance, any intelligent attendant can soon learn to adjust any tapes which may work loose. The first patient on whom I used it was a very athletic man, who used, in the fourth week after his accident, to indulge in sea-bathing and swimming. His case presented another point of interest, for the skin of the elbow on the injured side had suffered much abrasion, and needed frequent dressing, which would have been very difficult, in fact it was so whilst using Sayres' method, but was quite easy when the patient was fitted with the apparatus which I have described. Recently, the appliance, which was made for him, was used with equal success for his son, a lad of 16, who broke his collar-bone at football.

In conclusion, I would again point out that this appliance, more nearly than any other, produces an ideal traction on the clavicle in its long axis.

ON THE DIAGNOSIS OF ABDOMINAL TUMOURS IN RELATION TO PREGNANCY.

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[With Plate XII.]

THE diagnosis of pregnancy, when complicated by the presence of abdominal tumours, is a matter which may test the powers of any clinician however acute and however experienced. When the fœtal heart-sounds can be recognised, error is doubtless due, as a rule, to lack of care in the physical examination of the patient. But, in the absence of this sign, circumstances occasionally arise which not only defy the most studious consideration of careful observations, but may even baffle that still more valuable diagnostic agent which we call clinical instinct—that sub-conscious form of mental activity, by which some experienced clinicians recognise a morbid state just as they know a friend in the street, without any conscious process of identification.

For those of us who are not gifted with powers of this kind, it is well to bear in mind the questions which may arise in connection with an abdominal swelling, when pregnancy is suggested by certain features of the case.

It is clear that pregnancy, ectopic or uterine, may easily be mistaken for a new growth, for in many cases of pregnancy there is no absolute proof of its existence. Abdominal fat may prevent the recognition of fœtal parts, and, if the fœtus is dead, there is no fœtal heart-sound and no fœtal movements. In the absence of these definite signs, the diagnosis depends on the presence, not necessarily of a majority, but of a convincing number of the presumptive signs and symptoms of pregnancy. Several of these may be altogether absent. Thus there may be no morning sickness and no changes in the breasts ; or these may have disappeared, owing to death of the ovum, weeks before the patient is examined. Amenorrhœa may be replaced by irregular hæmorrhage. The regular growth of the uterus may be interfered with by death of the ovum, by hæmorrhage

into the decidua and uterine cavity, by vesicular degeneration of the chorion, or by hydramnios. The same conditions may alter the characteristic consistency of the pregnant uterus, and may simulate features characteristic of one tumour or another.

The regarding of the tumefaction of pregnancy as a new growth is, however, a somewhat rare mistake. Pregnancy is so common and abdominal new growths are relatively so rare that the ordinary wise man, when in doubt, decides for pregnancy because it is the more common condition, and he is generally right.

There are, however, some men who are always on the outlook for rarities, who have, in fact, a temperamental tendency to diagnose the exceptional, and who are often wrong in consequence. When a man of this type sees a case which presents no positive signs of pregnancy and which has certain features suggestive of new growth, he may doubtless cut down upon the pregnant uterus. In the following case a physician who had a reputation for diagnosing the most unlikely condition he could think of, nearly led an experienced gynæcologist into this mistake.

A woman, aged 52, who had not menstruated for over a year, was seen in the out-patients' department of a large general hospital by an assistant physician, who, thinking her ill enough for admission, sent her upstairs as a stomach case on account of progressive vomiting. She was admitted to the wards of a physician whose resident discovered that she had an abdominal tumour. The gynæcologist to the institution saw the case with the physician and his resident, an anæsthetic being administered by the gynæcologist's resident, who thus did not examine the patient at this time. A diagnosis of degenerating fibromyoma uteri was arrived at, and the gynæcologist's resident was told to prepare the patient for operation on a certain day. A student, who was clerking in the gynæcological ward, then took fresh notes of the case and, while making a complete routine examination, discovered the fœtal heart sounds. Thus the first person who went through the whole case for himself arrived at a complete diagnosis, while each of his seniors omitted something through relying on his colleagues. The names of the authorities concerned in this case would add greatly to its interest, but would not make it more instructive.

"Many hands make light work" is doubtless a good example of proverbial philosophy, but a still better is, "Too many cooks spoil the broth."

A source of error very common in hospital work is the collection of the evidence upon which a diagnosis is to be based by a number of different people.

While it is possible to mistake a pregnancy for a tumour, it is easy and not at all unusual to mistake a new growth for a pregnant uterus. Many of the presumptive signs of pregnancy, such as sickness and amenorrhœa, occur in connection with tumours. A linea nigra may be seen and dusky discoloration of the vaginal mucosa may be observed under varying conditions. The breasts, even of nulliparous women, contain secretion in certain cases of uterine tumour, and muscular contractions may be noted in the capsule of a softened fibroid. Tumours of this kind can simulate the shape and the consistency of the pregnant organ, and, during the progress of degenerative changes in a fibroma, even the rate of growth of the abdomen during gestation may be closely imitated. The more solid portions of a cystic growth may resemble the fœtal parts usually recognised, and a uterine soufflé may often be heard. Tubercular peritonitis is a condition that often gives rise to doubt. Seen in young subjects, it is frequently accompanied by amenorrhœa and progressive uterine enlargement due to encysted fluid and tubercular deposits occurring in combinations that may simulate almost any other abdominal condition. I well remember opening the abdomen of a young girl with tubercular peritonitis, who was thought by herself and her friends to be pregnant. There was great improvement after the operation, and the girl married. Later she was brought to see me on account of a supposed recurrence of the tubercular trouble; but this time she was really pregnant and presented a curious complexity of physical signs. She has now two children and is quite well, though at the time of the operation the abdomen was full of tubercular deposits.

Lack of knowledge is seldom the cause of mistakes made in practice. There are other sources of error much more fertile than this. The most prolific of all is the habit of taking the diagnosis of pregnancy from the patient.

In the ordinary course the practitioner does not diagnose pregnancy. The patient tells him that she is "expecting," and desires his attendance on or about a certain date. Examination is resented, even if proposed, and, as a result of this custom, few men secure really adequate experience in bimanual and abdominal palpation of the pregnant uterus. Even during labour but little knowledge of the feel of the organ is gained, for vaginal examination is rightly avoided, and the left lateral posture, used in this country, renders abdominal palpation troublesome, since it entails a change to the dorsal position, and this, moreover, is one to which many patients object. Thus it follows that, in doubtful cases, when an examination is made, its value is discounted because the practitioner is not absolutely familiar with the physical signs of gestation at different stages.

Let me give an amusing illustration of the result of taking a patient's diagnosis, from the practice of a friend who is not now living. A married woman, with several children, mentioned to him the date of the last menstrual period and that of her expected confinement, which she wished him to attend. After noting the dates, he dismissed the matter from his mind until his attention was recalled by a message from the patient to the effect that she had gone a week past her time. On examination he then found her with a large abdominal swelling, and with a rounded, firm mass in the pelvis, which he took for a fœtal head. The large, soft cervix was in front of this mass. With certain recorded cases of prolonged gestation in his memory, he temporised until 13 months had elapsed since the last menstrual period, and finally made an attempt to induce labour. This failing, the case was sent to hospital, and the supposed fœtal head was found to be a tense dermoid cyst of the ovary, which I easily removed. The abdominal swelling was due to internal and external fat, which had been deposited since the menopause occurred 13 months before.

I recently operated on a young woman of 20, who had double ovarian cystic disease, with complete amenorrhœa of some months' duration. The main cyst was like a pregnant uterus, and solid portions resembled fœtal parts. A doctor was engaged to attend the confinement, and before discovering the condition he actually went to the house twice when summoned,

taking his midwifery bag with him, only to find the patient suffering from pain of intestinal origin. Being a member of the modern school, he at first made no vaginal examination, a form of abstinence which has some disadvantages when one is not an absolute expert at abdominal palpation. Cases like these show that Sir J. Y. Simpson's instructions to students were not superfluous, when he taught that the first thing to do at midwifery cases was to "ascertain that the patient is pregnant."

Another friend once answered a call to a woman he had never seen before, and found he had been sent for because the patient, her friends and the midwife had all diagnosed twins. He examined the large abdomen, and found a groove crossing it obliquely between two solid bodies. The cervix was dilated and a head presented. A child having been born and followed by an after-birth, the doctor waited for some time, but, being also a modern man, avoided vaginal examination. As nothing happened he then left the house and, returning later in the day, found things as they were before. Further examination now convinced him that the solid mass which remained was a tumour. Those in charge of the patient, however, refused to adopt this view, and also refused to let the doctor leave the house. I was sent for as a sort of arbitrator, and found an irregularly ovoid firm tumour which roughly resembled a flexed fœtus in size and shape. The uterus was distinct from this mass, which we decided to be a malignant growth of the left kidney. Subsequent events proved this to be a correct diagnosis.

There is, indeed, every excuse for the man who slips into the error of presuming pregnancy in its absence. In the first place, as above mentioned, he probably does not examine at all and, if he does, his want of familiarity with the physical signs recognised destroys his confidence in his observations. Secondly, when a woman says she is pregnant, she really is so in an enormous majority of cases. Thus, by taking her diagnosis, the practitioner is right in an overwhelming proportion of instances. Further, in the early months, it is never safe to say that a woman is not pregnant, for there is, as a rule, nothing to prevent her from becoming so before her doctor sees her again.

Even in the later months of a supposed pregnancy it often requires great strength of mind to refute the opinion of the patient, her friends, her relatives, and the nurse. To do so without giving mortal offence demands endless tact.

Sometimes it is impossible to convince the patient. I once saw a lady who was sent to me because she thought she was five months pregnant, and who would not take her doctor's word to the contrary. I assured her that she had reached the change of life ; but, four months later, I had enquiries about her from a town in Ireland, where she was staying in a hotel with a complete set of baby clothes, a nurse sharing her apartments, and a doctor in constant attendance. Some weeks later, I heard that she was still "expecting" in spite of the assurances of a well-known consultant, who described her abdominal enlargement, in the words of the alliterative student, as due to fat, fæces, and flatus.

A case previously mentioned illustrated the dangers to which a patient may be exposed through the employment of too many advisers. The following case has the same moral.

A healthy young woman, 26 years of age, who had three children, and who menstruated regularly, noticed, one January, some abdominal swelling. This increased fairly quickly, and, after the month of April, she ceased menstruating. On July 6th she consulted me. Beyond amenorrhœa, there was no symptom of pregnancy. She had an abdominal swelling of the size and shape of an eight months' pregnant uterus. Fluctuation was pronounced. Palpation above the umbilicus revealed a solid body suggesting a fœtal limb, while, in the hypogastrium, there was a solid mass resembling a fœtal head. The large soft cervix was high up in the pelvis, and the body of the uterus could not be distinguished from the lower portion of the abdominal tumour. Auscultation gave negative results. It appeared certain that there was an ovarian tumour ; but was the amenorrhœa due to this, or to an early pregnancy ? It was impossible to exclude the latter, and a diagnosis of ovarian cyst with early pregnancy was written to the patient's doctor. I recommended removal of the cyst, but this was refused. What occurred subsequently, I discovered later.

On July 27th, the patient fainted and the bulk of the

swelling disappeared, growth of the uterus doubtless having led to rupture of the cyst, and collapse of the patient.

On July 30th, she began passing blood and clots per vaginam abortion following the disturbance caused by rupture of the cyst. On August 14th, she was admitted to a hospital, with a high temperature and foul vaginal discharge. The case was diagnosed as one of incomplete abortion, and the authorities at the hospital emptied the uterus, but would not accept the practitioner's statement that there was a large ruptured cyst in the abdomen. The solid mass above mentioned was felt beside the uterus, but was regarded as inflammatory in nature. The patient went home on August 20th, but had an irregular temperature. Her doctor at this time was away for three weeks, and on his return found the cyst filled up again and as large as ever. I saw her with him on September 5th, and found the physical signs as on July 6th, except that the cervix was now small and firm.

On September 7th, signs of peritonitis appeared. On September 8th, the temperature was 102°, the pulse 140, and vomiting was constant. On the 9th, I was hurriedly summoned and found her still worse. The abdomen was full of free fluid which obscured the cyst.

On opening the abdomen a large quantity of turbid fluid escaped, and the cyst was quickly emptied and removed. On cutting through the pedicle, it was noted that a little pus escaped from the Fallopian tube. The remainder of the peritonitic fluid was left *in situ*, and no drainage was attempted. The next day the pulse was 84, and the temperature 99°. She recovered without a hitch, and has had three children since the operation.

The tumour contained two solid masses, those felt at the original examination. The tube was no doubt infected from the uterus at the time of the abortion. At the examination, on September 5th, I doubtless squeezed pus out of the tube into the abdominal cavity, so setting up peritonitis. As she had been septic for a month, her power of dealing with the septic poison was obviously good, and the alarming nature of the symptoms was evidently due to the mechanical pressure of the cyst and the ascetic fluid rather than to septic intoxication. This was my reason for neither sponging out the

abdomen nor draining it, the object being to avoid shock. This course was justified by the result.

The cases hitherto mentioned are intended to illustrate common sources of error in fairly simple conditions, and their value is, I fear, anecdotal rather than scientific. Let me now give three cases of fibromyoma uteri, in two of which pregnancy was a complication, while in the third it was strongly suspected to exist by several good observers. These were cases in which the differential diagnosis presented real difficulty at one stage or another.

A single woman, aged 44, was admitted to hospital complaining of abdominal swelling of some weeks' duration, with repeated attacks of pain and alternating retention and incontinence of urine, during the last three months. She had had no children.

Menstruation had been regular and profuse until within about three months of admission, when it was replaced by an occasional irregular slight discharge, reddish in colour.

She was a stout woman with a thick layer of fat on the abdominal wall. There was dribbling of urine, and the bladder was much distended. After 66 ounces of urine had been drawn off, it was noticed that the bladder did not contract, but that its flaccid and thickened wall remained between the abdominal wall and a tumour, which could be felt occupying the pelvis. The cervix was high up behind the symphysis, and was large and soft. It was pressed against the urethra by a fairly firm tumour of rounded form, which filled the pelvis and compressed the rectum against the sacrum. This tumour appeared to be a uterine fibroid. What was the cause of the amenorrhœa? Patients with fibroids do not, as a rule, reach the menopause so early, and shrinkage rather than growth would be expected in a fibroid at the change of life. But this tumour had evidently grown during the last three months, for it had only begun to cause pressure symptoms during that period. The supposition of early pregnancy in a fibromyomatous uterus would account for the amenorrhœa, the large soft cervix and the recent growth of the mass. There were no other symptoms or signs of pregnancy. The patient's single state, her personal appearance, her age, and the possession of a tumour were against it. A possible diagnosis was

retroversion of the gravi uterus with impaction. Supposing the uterus to contain a dead ovum with a mass of firm blood clot gradually increasing in size through repeated hæmorrhages, all the symptoms and signs would be explained.

Manipulation failed to raise the tumour out of the pelvis. I therefore incised the abdominal wall in the usual position; but, on getting through the retroperitoneal fat, came down on the thickened wall of the bladder. The upper limit of this viscus reached the umbilicus, and at this level the peritoneal cavity was opened. The walls of the bladder felt about one-third of an inch thick, and the organ did not contract at all. It must have been distended for weeks, and thickened by inflammatory processes which had destroyed its elasticity. Throughout the operation it kept flowing across the field, and, together with the fat abdominal wall and distended intestines, caused great technical difficulties. A supra-vaginal hysterectomy was performed. There was a considerable quantity of blood in the urine for a week after the operation, and thereafter there was a little pus for a few days. The mass removed was ovoid in form (*see* Fig. 1). Its upper pole consisted of the body of the uterus, which contained a complete ovum of about three months' growth. The remainder of the mass was a fibroid, occupying the posterior uterine wall, and measuring 4 inches in its shorter diameter and 6 inches in length. As a point of interest, it may be mentioned that microscopic sections of the cervical canal showed that the cervical endometrium had undergone considerable decidual change. In this case the diagnosis was not really completed until the specimen was cut open after removal, for, though it became clear, on opening the abdomen, that the uterus contained a fibroid which demanded its removal, the softening of its upper portion might well have been due to cystic degeneration and not to pregnancy.

A still more instructive case was that of another patient of the same age, 44 years, who had been married nine years but had never been pregnant. She always menstruated regularly, the periods lasting three days, until the end of December, when the period lasted only one day. After this, amenorrhœa was complete. She had some abdominal pain in January, and irritability of the bladder soon began to be troublesome. I saw

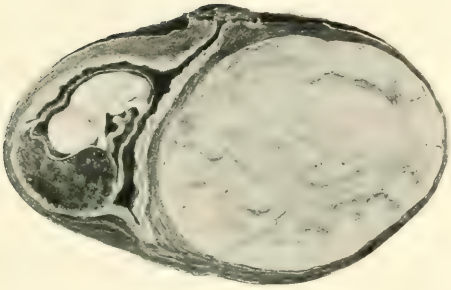

Fig. 1. *Left half of uterus removed by supra-vaginal hysterectomy, showing fibroid in posterior uterine wall and fœtus, placenta, and membranes in the uterine cavity.* (*W. E. F., del. ad nat.*)

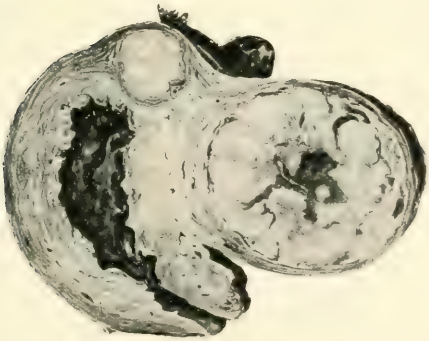

Fig. 2. *Right half of uterus removed by supra-vaginal hysterectomy eight days after labour, containing a small fibroid at the fundus and larger degenerated fibroid in the posterior wall.* (*W. E. F., del. ad nat.*)

her at the end of May, when she complained of occasional abdominal pain and swelling, and of irritability of the bladder. There was a thick layer of fat on the abdominal wall. A cystic swelling was felt above the pubes reaching half-way to the umbilicus, and a firm rounded tumour filled the pelvis in such a way that the cervix could not be felt at all. A few drops of secretion could be squeezed from the breasts, which were not enlarged or tender.

The tumour in the pelvis was apparently a fibroid, and the diagnosis lay between pregnancy complicated by fibromyoma, and cystic degeneration in the upper portion of a myomatous uterus occurring after the menopause. In this case, the presence of fluid in the breasts favoured pregnancy, though it is sometimes seen with fibroids. The patient was young for the menopause, considering that she had a fibroid, especially as degeneration in these growths is usually accompanied by uterine hæmorrhage. Against pregnancy was the age of the patient, her previous sterility though nine years married, and the presence of a fibroid.

It was decided to wait a few weeks before determining upon any course of action. On July 10th, the cystic portion of the tumour was obviously the pregnant uterus, and the fœtal heart sounds were heard. The cervix was still quite inaccessible, but the tumour in the pelvis was more yielding and elastic than before. The patient, being anxious for a living child, decided to let pregnancy run its course, after I had explained that, should Cæsarean section be necessary for delivery, it could be followed by the removal of the tumour, and would not expose her to a risk much greater than that of an earlier operation which would sacrifice the child. She came into a nursing home on August 22nd fully prepared, if necessary, to undergo Cæsarean section followed by removal of the tumour. The tumour in the pelvis was then softer than before. Arrangements were now made for Cæsarean section at a moment's notice. A few days later, labour pains began in the afternoon, and a show soon followed. At 7 o'clock, I could feel part of the cervix between the tumour and the symphysis. The membranes ruptured spontaneously two hours later. I now found that I could pass my hand in front of the tumour, where I felt a foot

The patient was at once anæsthetised, and I then pushed up the obstructing mass out of the pelvis, brought down both feet and delivered a living child. The tumour slipped back into the pelvis immediately, but the third stage presented no difficulty. The patient progressed quite normally, but the tumour became softer than ever, and felt more like a dermoid than a fibroma. Convinced that degeneration was going on, and being afraid to leave it alone, I opened the abdomen eight days after labour. The tumour occupied the posterior wall of the uterus, and was fixed to the floor of the pouch of Douglas by a layer of partly organised blood clot. Supravaginal hysterectomy was easily done, and the patient made a rapid recovery. The fibromyoma was almost spherical, and was four inches in diameter (*see* Fig. 2). It must have undergone rapid changes during pregnancy and after labour, for it was transformed into a soft ish mass of greenish amorphous débris, which filled the meshes formed by strands of the more resistant fibrous tissue of the growth. It had a complete covering of uterine muscle, but this was extremely thin at one point, and must have ruptured in a few days, with disastrous results to the patient. The value of observations extended over a period of many weeks is well illustrated by this case. An earlier hysterectomy would have sacrificed the child, and a Cæsarean section, done without waiting for labour, would have been more risky than the labour with manual assistance, followed by removal of the necrosed tumour before it had time to do any harm.

For comparison with the last case, the following is not without interest :—

A patient, aged 30, was admitted to hospital complaining of a growing abdominal swelling, irregular hæmorrhage, and leucorrhœa. She had been married four years, but had not become pregnant. Until the last few months menstruation had been regular, of the 28 days' type, and three to four days' duration. For the last eight or nine months irregular hæmorrhage with clots had alternated with an inoffensive whitish discharge. During the same time the patient had become conscious of a lump in the abdomen, which grew slowly at first, and more rapidly during the last four months.

Inspection showed a tumour extending obliquely from the right iliac region to the left costal margin. Firm and solid in

the right and lower portion, it had the consistency of the gravid uterus in the left and upper portion, which showed muscular contractions from time to time. There was the suggestion of a groove running obliquely between the more solid and the more cystic portion, but the mass formed one continuous whole. The cervix was large and soft, and was continuous with the lower portion of the tumour. The breasts contained a somewhat watery secretion. The increase in size of the tumour continuous with the uterus, together with irregular hæmorrhage of some months' duration, pointed to the occurrence of cystic degeneration in the upper part of a fibromyomatous uterus.

But it was not quite easy to exclude pregnancy, for, although no fœtal heart sound or fœtal movements could be recognised, the cervix was large and soft. There was fluid in the breasts, and the softer part of the mass had the consistency of a gravid uterus and presented occasional contractions. One remembered various morbid pregnancies with often repeated hæmorrhages and ultimate death of the fœtus. Vesicular degeneration of the chorion in a uterus containing a fibroid in its lower portion was one diagnosis suggested.

On opening the abdomen, the mass assumed a symmetrical position, the solid lower portion going to the back and the cystic upper soft portion coming to the front. The appearances were now so like those at a Cæsarean section that some of those present thought the incision should be closed at once. I adhered, however, to the primary diagnosis, and did a supravaginal hysterectomy, from which the patient made a good recovery. The solid part of the mass proved to be the uterus itself, the large soft upper portion was a degenerating fibromyoma, developed from the anterior uterine wall, and enclosed in a thin layer of uterine muscle. The new growth was converted into innumerable small cysts, clear fluid ran freely from the cut surface and rapidly reduced the bulk of the mass. The uterine walls were much thickened, and the cavity was spread out over the lower pole of the large ovoid tumour.

The reader may remark that I have made no reference to the use of the sound as an aid to diagnosis in the class of cases under discussion. This has been purposely omitted, for

in cases of this kind the uterine cavity is often so distorted that it is difficult or next to impossible to explore it with the sound without producing breaches in the continuity of the mucosa. In many of these cases, we have to deal with degenerating tumours, and in these inflammatory processes are set up with striking ease. Thus the use of the sound is attended with considerable risk, so rapid are the results of slight infections. I recently saw a patient who had had a large fibroid for 30 years which was then showing signs of degeneration. One day a slight intestinal disturbance appeared to determine an acute inflammation of the lowly vitalised tumour, and on the next day the patient died of peritonitis. In the presence of pregnancy the sound is, of course, contra-indicated. It thus appears to me that, in those cases of abdominal swelling in which the diagnosis lies between pregnancy alone, new growth alone, or a combination of the two, the sound should be used only when the patient is prepared for operative treatment, and is already anæsthetised.

ASPHYXIA NEONATORUM: ITS CAUSES AND TREATMENT.

A DISCUSSION ON THE MANY THEORIES AND PRACTICES OF THE PRESENT DAY.

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Still-birth, the subject of this paper, a complication of labour so frequently met with in the practice of obstetricians, and the majority of general practitioners; and which, in unfavourable cases, is capable of bringing into houses so much distress and heartrendings, is undoubtedly worthy of our close attention. That much skill and thought have been abundantly bestowed upon it, is evidenced by the extensive accumulation of literature on the subject, much of which, dating back many years, is the work of experienced and competent writers. That considerable difference of opinion exists as to the best method or methods to be adopted with a view to saving the life of the asphyxiated infant, is plainly shown by the fact that certain authorities on the subject advocate one method of resuscitation, whilst others advise an entirely different procedure. The purpose of this paper is to briefly discuss the various causes of asphyxiation in the new-born, its prophylactic and curative treatment; and, while touching upon all the recognised methods extant, to avoid any minute and unnecessary details.

In order to have a clear conception of the mechanism producing asphyxia neonatorum, and therefore to be in a position to adopt such measures as are best calculated to prevent or cure the condition, I think it will be profitable at first to study briefly the influences which are normally at work in order to enable the new-born child to carry on an independent existence; in other words, it will be useful to review the physiology first, the pathology later. But before passing on it might be advisable to define the term "still-born," as there sometimes exists not a little confusion between it and "dead-born." "Still-birth" has been defined as "a persistence of partial or complete apnœa after birth." The Anglo-Saxon name is as satisfactory a definition as we have—the child is "still"—the absence of movement

applying to the muscles concerned in the act of respiration as well as to the muscles of the limbs, etc. But the dead born child is also "still"; true, but a still-born infant is not dead-born although it may eventually succumb, having never breathed or cried as a normal child. As we are aware, at the moment of birth certain alterations in the circulation normally take place. When the child begins to breathe, the pulmonary circulation becomes established, and a great portion of the blood, which was previously pumped by the right ventricle into the aorta *viâ* the ductus arteriosus, now travels by the pulmonary arteries to the lungs, there to become reoxygenated and to be relieved of some impurities. But if the lungs are not functionating, only a small proportion of blood is carried to them, the remainder, still retaining its impurities, is carried by way of the ductus arteriosus into the systemic circulation. In the unborn child, this blood travels to the placenta through the hypogastric arteries and umbilical cord, there to give up CO_2 and other impurities, and to receive in return oxygen and nutriment. But if the child is born, whether separated from the mother or not, it must depend upon its own lungs to aerate its blood, and if these organs are not, as in cases of asphyxia, fulfilling their normal function, a vicious circle is set working which may eventually end in the death of the child. In the medulla, low down in the floor of the fourth ventricle, and situated near the vaso-motor centre, is the "Nœud Vital," or respiratory centre, which presides over the function of respiration. This is the only *true* respiratory centre, although it has been supposed that in the spinal cord there are subsidiary centres; these have been shown to be only cell-stations in the anterior horns of grey matter, with which certain centrifugal respiratory nerve fibres arborise. This respiratory centre is both "automatic" and "reflex." "Automatic" depending on a proper blood supply; "reflex" because it can be stimulated to increased action by afferent impulses travelling up the vagus nerves from the lungs, or from the periphery by sensory nerves.

When the child is born, the stimulus normally created by the cool air travels to its respiratory centre *viâ* the sensory nerves, and there sets the machinery going, which continues to act automatically while life lasts. Painful stimuli, such

as slapping the child, act in a similar way. But should these afferent impulses fail to call forth the natural response, yet another stimulus appears shortly in the form of an excess of CO_2 in the blood. The child, deprived of oxygen from the maternal blood, soon creates an excess of carbon dioxide in its own blood, and this, carried to its brain, acts as a powerful stimulus to the respiratory nucleus; if the centre replies, the lungs begin their work, the vicious circle spoken of is relieved, and all is well; but should the nucleus be injured mechanically or chemically, or should there be any mechanical obstacle to the expansion of the chest, or to the descent of the diaphragm, or to air being drawn into the respiratory passages by efforts at inspiration; then the CO_2 in increasing quantities becomes a poison to the respiratory nucleus, which it soon exhausts and paralyses, and the consequent asphyxia, if not promptly and systematically treated, soon ends in death. So much for that side of the question; now what concerns us most is "what are the conditions that will bring about this abnormal state of affairs"—that is to say, "what are the causes of asphyxia neonatorum"? The causes may be divided into intra- and extra-uterine, the word "uterine" being used in this connection for the sake of brevity, and embracing the whole parturient-canal. A few of these may be dismissed with a word, for they are circumstances over which we, as obstetricians, have little or no control, at any rate, not at the time of delivery. I refer to:—

The Cord.—Tight knots. Twisting tightly upon itself. Loops around trunk or limbs.

The Mother.—Sudden death. Fevers. Eclampsia. Accidental hæmorrhage. Poisoning. Obliterative changes in placental vessels.

The Fœtus.—Immaturity. Syphilis of liver or lungs. Dropsy. Some tumours. Monsters, etc.

Among intra-uterine causes which appropriate treatment might control or remove may be mentioned:—

Delayed Labour.—In contracted pelvis, in dry labour, and especially in breech presentations.

Prolapse and Presentation of the Cord.

Placenta Prævia.

Deep Chloroform Anæsthesia of the Mother.

Under prophylactic treatment given below, these causes

will be better dealt with individually. Among extra-uterine preventible causes may be mentioned such accidents as allowing the child to lie face downwards in blood or liquor amnii upon the bed when the doctor is short handed, and when the condition of the mother demands all his attention. This is a rare and easily preventible occurrence; the treatment is obvious.

As for the other causes mentioned, the prophylactic treatment resolves itself into:—the correction of mal-presentations; the prevention or replacement of a funis prolapse; the protection of the membranes from too early rupture; the judicious use of the forceps; and the avoidance of carrying chloroform anæsthesia to the full surgical degree unless absolutely necessary. In certain cases, such as contracted pelvis of a lesser degree, risks to the life of the child are frequently unavoidable, and in others, such as placenta prævia, the life of the child may at times be antagonistic to that of the mother; in these circumstances, it must take its chance.

In breech presentations, as a rule, if the after-coming head remains in the passages for three and a half minutes after the birth of the shoulders the child will be born in "asphyxia pallida"; and, if it remains eight minutes, will be born dead. Several factors are at work to produce this result; the cord is probably being compressed between the pelvic brim and the fœtal head; the placenta is in process of separation; and the stimuli of the cool air and of the necessary manual manipulations are sending afferent impulses to the respiratory centre, the net result of all these being that premature unsuccessful attempts on the part of the child are made to inspire air; and instead, mucus, liquor amnii, meconium, or vernix caseosa, may be drawn into the respiratory passages, asphyxia resulting. In other cases direct injury to the medulla by too strong traction upon the child's neck, in order to extract the head, may cause intra-cranial hæmorrhage, or the same violence by injuring the phrenic nerves may lead to the death of the child, whose normal breathing is so largely diaphragmatic.

The prophylactic treatment in the cases will be slow delivery of the *complete* breech in order to allow the fullest dilatation of the soft parts, followed by rapid yet deliberate and systematic delivery of the shoulders and heads according

to the well-known methods, and that as gently as is consistent with speed. It is probable that more lives are lost by want of skill in the conduction of breech cases than by any other of the cases mentioned; and not a few are sacrificed through want of skill in the resuscitation of the infant in breech cases, which caused unavoidable delay in the delivery of the after-coming head.

In vertex cases, otherwise normal, very large heads, requiring over-moulding in order to pass through the bony pelvis, will sometimes be subjected to such severe compression as to stimulate prematurely the respiratory centre, asphyxia of course following; or the same pressure may cause hæmorrhages into the fourth ventricle, cortex, or meninges, with a corresponding result. In such cases, the judicious and skilful application of the forceps may prove a life-saving measure, although it must be remembered that forceps themselves are responsible for an occasional instance of intra-cranial hæmorrhage.

By a careful attendant, the diagnosis of threatened asphyxia is readily made, enabling him then to apply the various measures at his disposal to prevent it. Uterine contractions normally cause alternate quickening and slowing of the fœtal pulse; and experience has taught us that very marked acceleration or retardation—160 to 180 per minute on the one hand, and 100 on the other—is incompatible with the life of the child for any considerable period. Unusual struggling movements on the part of the fœtus, either seen or felt, is also a sign of commencing asphyxia.

In vertex presentations, in which unusual delay or pressure, as mentioned previously, is present, asphyxia may be recognised, if it has not already been so by auscultation, by the fact that, when becoming more pronounced, the sphincter ani muscle becomes relaxed, and meconium, pure or mixed with liquor amnii, may be noticed coming from the vagina of the mother. The forceps will save many of these cases.

In other vertex cases, impaction of the shoulders may cause such delay that the child, whose head is born, may make vigorous yet fruitless attempts to breathe, the impaction effectually preventing its chest from expanding, the uterine contractions—by pressure on the abdomen of the child—its diaphragm from descending, while the umbilical cord may at the same time be firmly compressed, especially if very long, or wound round the neck of the child. Skilful manipulation

will, in most of these cases, save the child, and fortunately, in such instances, the attempts to breathe are not complicated by the aspiration of mucus, or other fluids, into the respiratory passages, consequently when the infant is fully born it will probably do well.

In fatal cases of asphyxia neonatorum, certain pathological conditions are commonly found post-mortem; the principal ones are the following, and are all easily explained. Grooves and fractures of the fœtal skull; the air passages may contain mucus, meconium, or liq. amnii; the lungs may be engorged, and may contain many unexpanded air vesicles, and perhaps patches of ecchymosis on the pleural surfaces; while there may be extravasations and ecchymoses in the brain, meninges and liver, some the immediate cause of the asphyxia, others perhaps the direct result of too violent measures adopted with the object of resuscitating the child.

The immediate prognosis in asphyxia neonatorum depends largely upon the efficiency and promptitude of the treatment, as well as on the original cause of the condition. It is unfavourable, as a rule, in cases of injury to the skull or brain, and in intra-cranial hæmorrhages. The pallid variety of asphyxia is always of much more serious import than the livid. Unfavourable symptoms are very widely dilated pupils, continued weakening of the heart's action in spite of treatment, and progressive lowering of the body temperature. The temperature of a new-born child is usually about 100 F.; soon after birth it falls to about 97·5 F., only to rise again to normal in a few hours if the infant is healthy. If a fall of three or four degrees Fahrenheit is not soon rallied from, it may be taken as of ill omen for the life of the child. This latter point has an important bearing upon the treatment, and will be referred to presently when that is under consideration.

The *remote* prognosis is affected by several factors. If the lungs have not been fully inflated, the child may die in a few days of atalectasis, or of a low form of pneumonia of the unexpanded portions of lung. Aspiration pneumonia is responsible for the lives of not a few children, and immaturity only aggravates the case. Amongst the poorer classes, want of the warmth and the special care, so often necessary as an after treatment, is responsible for some deaths following upon a successful resuscitation.

As is well known, there are two main varieties of asphyxia, viz., Livida and Pallida. Some authors describe a third, but temporary apnœa, from which recovery takes place either without any treatment, or through the adoption of such simple measures as slapping or blowing upon the child, is hardly worthy of the name asphyxia. The "Pallid" is much the more serious of the two forms; in fact it is but a further and more aggravated stage of the "Livid"; the child having first to pass through the latter variety in order to reach the state of Pallida. And, conversely, if the pallid infant is to be resuscitated, it must first pass into a state of asphyxia livida. The appearance of the child differs widely in the two cases, and the treatment, at any rate in part, also differs to a very marked degree. They may be roughly contrasted thus:—

	A. Pallida.	*A. Livida.*
Colour	Pale or white	Cyanosed or livid.
Reflexes	Absent	Present.
Pupils	Widely dilated	Normal.
Heart	Slow, feeble, ? irregular	Slow, strong, regular.
Respiration	Absent	If any, feeble or spasmodic.
Muscular system	Limp and flabby	Normal.
Temperature	Lowers rapidly	Normal.
Foreign substances in respiratory passages	Usually present in quantity.	Usually present.
Umbilical cord	Thin, pale, not pulsating, vessels nearly empty.	Converse.
Sphincter ani	Relaxed	Normal.

From a careful consideration of these symptoms, the treatment in the two varieties will almost suggest itself. In both cases, if the treatment adopted is successful, these abnormalities will one by one right themselves, and to this end we must direct our efforts to *establishing, or improving, the working of the respiratory and circulatory systems*, at the same time taking precautions to prevent the body temperature from falling below normal, and this point is of extreme importance, as in the pallid variety the child is in a state of *collapse*, as well as in a condition of apnœa.

Now as to the curative treatment. If foreign substances,

which have been inspirated into the air passages by premature efforts at respiration, are present in any considerable quantities, as they usually are, more especially in the more profound degree of asphyxia, it is plain that the best treatment will be to at once remove by some means or another the offending fluids, lest artificial respiration, which will be the next method to adopt, should only serve to draw the mucus, etc., nearer to, or actually into, the lungs themselves, there either to prevent successful resuscitation, or to cause pneumonia a day or two later. There are at our command several methods for removing the offending fluids from the mouth, pharynx, larynx, and trachea, some simple, others difficult, and all are not equally effective. The following plan, which is often adopted in cases not complicated by asphyxia, will be tried first:—

A piece of soft linen, or the corner of a towel, damped with water, is used to wipe out the mouth and as much of the pharynx as can be reached with the finger. While this is being done, if the fluids have found their way nearer to the lungs, then gravity will materially assist in its expulsion. The nurse will therefore suspend the child by its heels while the pharynx is being swabbed. If this is found insufficient, as is commonly experienced in asphyxia neonatorum, some instrument must be used which will penetrate the recesses of the respiratory tract which the finger cannot reach. A catheter has long been used for this purpose, usually a rubber or gum-elastic one, one end of which is inserted into the pharynx, or even through the glottis, whilst to the other end suction is applied by the mouth of the operator. Needless to say, this method is a very disgusting one, as anyone knows who has had the experience of drawing mucus or meconium into his own mouth; the danger, too, from syphilitic children cannot be over-estimated. Apart from these substantial objections, it is not always successful, as the eye of the catheter is not in a position best calculated to catch the fluid unless by chance.

Champney,[1] in his excellent monograph, published in 1886, described a method for removing fluids from the trachea, which is as follows:—A No. 9 gum-elastic male catheter is introduced into the trachea in such a manner that the point shall be three and a half inches from the lips of the child; the operator blows through the catheter, at the same time pressing

[1] *International Journal of Medical Sciences.*

the infant's thorax gently with one hand, in order to *prevent* the entrance of air into the lungs. The current of air is therefore directed *towards* the child's mouth after it leaves the eye of the catheter, and thus carries with it mucus, etc., to the pharynx, whence it is readily removed by other means.

While working in the Coombe Maternity Hospital three years ago, the danger and inefficiency of direct suction by the mouth, applied to the end of a catheter, led me to devise an instrument, simple yet effective, whereby suction could be utilized, but to be created by mechanical means instead of by the mouth of the operator. I found that with the viscid fluid, with which we are usually called upon to deal, *vis a fronte* was better than Champney's method of *vis a tergo*. The instrument called "mucus evacuator," and bearing the writer's name, was made and distributed by Messrs. Down Brothers of London, and was described in detail and illustrated in the *Medical Annual* for 1905.

Fig. 1.

The little instrument is simple in structure, and can be boiled without taking it to pieces. It has been in constant use in the Coombe Hospital since its introduction, and has proved indispensable. The glass tube is suitable for withdrawing mucus, etc., from the pharynx, nares, and upper portion of the larynx; if it is necessary to clear the trachea also, a soft catheter with a spherical end may be passed, and suction applied to the other end by the "mucus evacuator."

Having sufficiently freed the air passages from obstruction fluids, a process which should be done gently, yet as rapidly as possible, we must then turn our attention to the respiratory function. During the removal of the mucus, etc. the child may or may not, according to circumstances, be separated from its mother by ligation of the umbilical cord. What circumstances must influence us with regard to this point? It may be accepted, on the authority of the best observers, that it is to the material advantage of the infant that its cord should not be ligated until some time has elapsed after birth,

the reason assigned being that by uterine contraction, or by the commencement of pulmonary circulation and inflation of the lungs, some additional blood is gained by the child.

The latter reason has most supporters, and if it is the true one, then in cases of asphyxia pallida, in which respirations are absent, there can be nothing to gain by waiting. Moreover, as the cord is not usually pulsating, and is flabby with but little, if any, circulation of the blood contained in its partly-collapsed vessels, it is considered best to ligate early, especially as steps must be quickly taken to perform artificial respiration, and to prevent rapid cooling of the infant's body. In asphyxia *livida* the cord should not be tied until it has ceased to pulsate. While treating of the subject of the umbilical cord, it might be well to mention that it has been recommended, in cases of asphyxia livida, that a few drachms of blood should be allowed to escape from the fœtal end of the cord previous to ligating it. The treatment was probably founded upon an error, the cyanosed appearance of the child leading the originator to suppose that it possessed more blood than it ought to have. As a matter of fact, the child, if its lungs have not yet been inflated, has *less* blood that it ought to have, and exactly the same quantity as it would have in the pallid form of asphyxia; the difference between the two kinds being in the *distribution* of the blood and not in the amount (Champney). Moreover, if the cord is allowed to bleed, the blood would flow from the arteries, thus lowering the systemic blood-pressure without in any way opening up the pulmonary circulation. In any case, in asphyxia livida, the fault lies, not in the heart weakness from overfilling of the right chambers, for blood can readily flow thence into the left side *via* the foramen ovale, but in absence of the aërating surface due to the non-expansion of the lung. Therefore the child should *not* be bled, for if it is not a necessary proceeding it must be a directly harmful one, since infants bear loss of blood very badly.

Artificial respiration will next occupy our attention. There are many methods described, of which some will be mentioned only to be condemned. What is required is a "best method," if one can be found superior to all others; if it cannot, a line of action must be determined upon which has been proved to be "one of the best," and which must be followed in preference to

using a faulty system if the infant is but slightly asphyxiated, and a better method if there is the graver form of suffocation. It is best to use the safest and surest method of artificial respiration in all cases, varying only the length of time it is continued, in accordance with the severity of the case. All forms have some drawback, some have many. The names of Schultze, Silvester, Marshall Hall, Laborde, and Byrd are associated with a few of the recognised methods. Space would not permit an elaborate description of each, nor indeed is it advisable to give it, for some have proved in my hands and in those of others to be quite inadequate.

Byrd's method of alternately doubling up and extending the child's body, when supported on the palms of both hands, is not likely to do the infant any harm, if practised with gentleness. The same may be said of Laborde's tongue traction. In his method, with the child lying supine as in Sylvester's manipulations, a grip of the tongue is taken by means of a pair of forceps of small size, and rhythmic traction is made upon it. This, so Champney states, does not raise the epiglottis. The supposed advantage of the method is that the superior laryngeal, glosso-pharyngeal, and lingual nerves are irritated, and that they in consequence stimulate reflexly the phrenic nerves, producing a contraction of the diaphragm and intercostal muscles; but as irritation of the superior laryngeal nerve, supplying sensation to the mucous membrane of the larynx, stimulates only the expiratory portion of the respiratory centre, and as the lungs are yet unexpanded, what good can result? In any case, it is plain that this method depends for its efficiency upon the presence of reflexes, which, as we know, are absent in the worst cases of asphyxia; therefore this treatment, at any rate by itself, is found wanting.

The method of Marshall Hall, although an excellent adjunct to other treatment, is, as a primary treatment in asphyxia pallida, almost useless. In it the child is rolled upon the knees of the operator, who sits on a low chair placed near the fire, and with a towel over his knees. He grasps the right arm of the infant in his left hand, while steadying its body with his right hand placed upon its breech. He now rolls the child over almost on its face, at the same time compressing its thorax between his left hand and left knee; this is the position of expiration. Then, rolling the

child upon its back, its right arm is extended over its head and rotated outwards in order to make tense the tendon of the pectoralis major muscle, the combined movement tending to raise its ribs and thus increase the diameters of its thorax; this is the position of inspiration. The manipulations are continued rhythmically at the rate of about twelve per minute. A beneficial action of this method is that the compression of the thorax directly stimulates the heart's action, so raising the blood pressure of the collapsed infant.

Sylvester's method, an excellent one, has in its favour certain strong points, viz.:—I. Simplicity. II. Efficiency as regards the large volume of air drawn into the lungs. III. It may be practised while the child lies in a hot bath. IV. The movements may be timed so as to correspond accurately with the child's first spasmodic attempts to breathe. Its disadvantages are:—I. Counter-traction must be made upon the feet of the child. II. Gravity does not aid in the removal of mucus from its throat; but these objections can be easily overcome.

Schultze's method, so fully described in most of the leading works on obstetrics, need not again be described here. It too has certain points pro and con.

In its favour may be noted:—I. Efficiency. II. Tendency to expel mucus from the respiratory passages. III. Compression of the thorax stimulating the heart.

Against it are:—I. Appearances (a point which may count for something if *unsuccessfully* performed in the presence of the child's mother or of ignorant friends). II. It is not so easily performed by an inexperienced person, especially as its complications, though really slight, have caused it more than once to be wrongly described in books. III. Risks of injuring the child by letting it fall, or by the roughness of the manipulations if not skilfully performed. Both of these are avoidable, the former by care and by wiping away the slippery vernix before commencing artificial respiration; the other by practice, and care that the movements are not made so roughly as to risk rupturing abdominal viscera, or causing intracranial haemorrhage. IV. Again, if the child has been injured during delivery, *accidentally* as sometimes may occur in difficult breech cases, the humerus being fractured whilst taking down extended arms; or by *design*, as in cleidotomy, for the relief

of impacted shoulders, "Schultzing" is decidedly contra-indicated. V. The chilling of the child's body, an unavoidable occurrence however well it may be dried; although advantageous in asphyxia livida, where the cutaneous reflexes are not lost, is the worst possible treatment in A. pallida, where, besides the reflexes being gone, the child is in a state of profound collapse due to the paralysing action of the impure blood acting upon the vaso-motor centre as well as upon the respiratory centre in the medulla. VI. The unwieldiness of the manœuvres render it quite impossible to make the movements of artificial respiration synchronous with the slight gasping spasmodic efforts, perhaps few and far between, of the child to breathe.

Mouth to mouth insufflation has but little to recommend it. The dangers of imparting tuberculosis, or of contracting syphilis, may be exaggerated, but they are very real. The method would be very suitable in cases such as chloroform poisoning, in which the complication of foreign fluids in the respiratory passages is not present, but I believe that in asphyxia neonatorum the tendency would be to drive fluids into the lungs with a disastrous result. Of course, if the respiratory tract were clear the insufflation would be harmless and effective, provided that one hand is placed upon the epigastrium, in order to prevent the stomach from filling with the operator's breath blown down the œsophagus, and that the nose is closed, in order to prevent the air from returning through the nares, while the child's head is placed in such a position as to best open the glottis, the tongue being pulled forwards. Expiration is assisted by pressure upon the thorax. The small amount of CO_2 in the breath of the operator is not at all a substantial objection, especially if he breathes deeply several times before commencing the artificial respiration; but the method as a whole does nothing that cannot be more effectively done, and that with greater safety, by other methods. Much good may be done in cases of asphyxia by stimulating the reflexes if they are present. The respiratory centre, if not thrown entirely out of action by the accumulation in the fœtal blood of excess of carbon dioxide, and excrementitious matter, may be excited to act by peripheral stimuli, such as cold air or water, slapping, rubbing stimulating liniments or whiskey upon the child's body, etc.; but if it

is paralysed, as in A. pallida, then peripheral stimuli are useless. Furthermore, the same poison that acted upon the respiratory centre has also acted, though a little later, upon the vaso-motor centre, situated so close to it in the medulla, paralysing it, and causing the profound collapse and fall of blood pressure seen in the worst forms of asphyxia. Now if these centres are to be revived *blood must be sent circulating through them*, so the heart must be stimulated and the circulation assisted. *The blood must be pure*, artificial respiration must then be performed in order to gain this end. These methods I have successfully reinforced by more direct stimuli, *i.e.*, ether or whisky and strychnine hypodermically for the heart, with atropine or belladonna as a direct respiratory stimulant.

In order to counteract the shock and raise the blood-pressure, I have suggested a method hitherto, so far as I am aware, undescribed. We are aware of the action of adrenalin in normal saline solution, as administered intravenously in cases of surgical shock; this method may be applied in proportionately small quantities to the collapsed infant, passing the fluid through a small, blunt silver cannula into the umbilical vein, the ligature on which has been previously loosened. I believe the method has a future before it, but my personal experience of it is not sufficient to warrant too definite statements. The necessary apparatus and assistance make it difficult to apply except in hospital practice. During all these manipulations the body temperature must be kept up. I have previously alluded to the tendency of the child's temperature to fall rapidly through three or four degrees in asphyxia pallida. The hot bath, at from about 105° to 110° F., will keep up the temperature, but has the disadvantage of dilating the peripheral arterioles, and increasing the tissue waste and so the want of oxygen. But the "pros" are greater than the "cons," the stimulating action markedly increasing the action of the heart, and this the vitality of the child, at any rate at first, just as whiskey given to an adult will at *first raise blood-pressure* because the acceleration of the heart's action more than outweighs the dilatation of the peripheral arterioles. To lay aside for a moment the question of the particular line of treatment to follow, there is one golden rule; persevere with it until assured that the heart has ceased to beat, and that for some time. A heart which in spite of your labour beats progressivly

slower and with greater irregularity is invariably a hopeless case, and if the course adopted is a good one, then not unlikely the nerve centres are irreparably injured and the case is beyond your help. On the other hand, never desist from artificial respiration until, on examining the infant's chest, it is seen to expand equally on both sides, for an unventilated lobe may mean death in a day or two from atalectasis or pneumonia.

It will be somewhat difficult for the reader to gather now from what I have written, exactly which is the method I would recommend and practise, hence the description of how I would treat a typical case of asphyxia pallida will not be out of place. The child born, its cord is ligated and cut, and its legs wiped dry. Suspended by its legs, the mucus or other matter, is removed from its air passages by means of damp cloths and by the mucus evacuator devised by me for that purpose. Next the child is rapidly transferred to a large bath containing four inches of water at about 110° F. Into this it is placed supine, a rolled towel beneath its shoulders as in Sylvester's original description, so that only its head and face are above water; a small clip forceps is placed on its tongue, and allowed to hang to one side, using the angle of the child's mouth as a fulcrum to draw the tongue forward and to keep it there. Counter-traction is made by the nurse or other assistant upon the infant's feet, while the operator performs the typical Sylvester method of artificial respiration. Meanwhile a hypodermic syringe is prepared and ten or twelve minims of a solution, which I always carry ready for use, is drawn into it and injected subcutaneously over the deltoid muscle.

Every twelve minims of the solution represents—

Standardized tincture of Belladonna	♏i.
Strychnine	gr. $\frac{1}{100}$.
Whiskey	♏x.

This injection usually gives a noticeably beneficial result in about three and a half minutes, and the dose may be repeated in fifteen minutes if required. Now an ordinary enema syringe is dropped into the bath, and about two ounces of the bath water is gently injected into the child's rectum. At intervals the infant is lifted out of the water and, while suspended by the feet, its spine is well rubbed with whiskey or lin. camph. comp., and the mucus evacuator used again. As its condition begins

to improve, the widely dilated pupils will begin to contract, its heart will beat stronger and more regularly, and it will become less limp and flabby, while its colour will gradually darken, the child passing by degrees into a state of asphyxia livida. Now its reflexes have returned, and success is almost assured. As the child is lifted from the bath, the temperature of which is maintained at the original height, and suspended as before, it may at intervals be slapped, rubbed, and blown upon with the breath, especially the latter in the face which tends to stimulate reflexly the respirations. A little later a splash of cold water down the spine, or more effective still, in the face, will probably produce a gasp. Now Sylvester's method, unlike Schultze's, can be timed to act *with* the respiratory effort of the rescued child; when it gasps like a dying trout, as it is an inspiratory effort, draw up the arms quickly, and if it cries, however freely, compress the thorax to assist its expiration.

Do not use the cold bath, even for a moment, until well into the livid state with a strongly beating heart, otherwise a *fatal* collapse may result. Should the child, in spite of this combination of methods, fail to be resuscitated, the operator may at any rate feel assured that the best has been done for it.

The after treatment of the case is not less important. When respirations are established, and are fairly regular and full, the nurse may practise Marshall Hall's method before the fire, the child being well wrapped in sheet wadding. Later, when the child is placed in a basket near the fire, and carefully wrapped in wool and blankets, a careful watch must be kept in order to ascertain whether it continues to breathe satisfactorily. Hot-water bottles may also be placed in the basket around it. In bad cases a few minims of brandy may be administered in diluted milk every two hours, and gentle inhalations of oxygen, if its colour is not good. The essence of the after-treatment will be warmth and watching.

ON THE USE OF RUBBER GLOVES IN ABDOMINAL OPERATIONS.

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THE great triumphs of modern surgery are due almost exclusively to the power, which we have acquired, in recent years, of preventing the access of pathogenic micro-organisms to the field of operation. This is the aim alike of antisepsis and asepsis.

There is probably no department in the whole range of surgery in which success depends so largely upon the exclusion of these pathogenic micro-organisms from the wound area as in operations which involve opening the peritoneal cavity. During the performance of a cœliotomy, there are three possible extraneous sources of infection, namely, (1) the hands of the surgeon and his assistants, (2) the skin of the patient's abdomen, through which the incision must be made, and (3) the instruments (including ligatures, swabs, etc.) employed.

It is a matter of common knowledge that none of the various methods of sterilisation available approach in efficacy the application of moist heat. Boiling and the steam steriliser make this method available in the case of instruments, swabs, and ligature material. Where this method is inapplicable, as in the case of the hands and the skin of the abdomen, the preparations for operations become difficult and untrustworthy as regards sterility. In fact, as Mr. Bland Sutton[1] states (and the italics are his): "*Nothing should be allowed inside a patient's abdomen that has not been boiled specially for the operation, and as the surgeon's hands cannot be sterilised by heat he should wear rubber gloves which have been boiled.*"

It is now universally recognised that, since the employment of moist heat is inapplicable, there is no method available which will render the hands certainly and absolutely aseptic. The scrubbing brush and various chemicals may remove all

[1] *Essays on Hysterectomy*, p. 22.

organisms from the surface of the skin, but those which lie snugly in the hair follicles and sweat and sebaceous glands lie beyond the reach of these agents.

By the use of rubber gloves, the hands can be covered by an impermeable material which can be sterilised by boiling, and this without interfering with the manipulative dexterity of the surgeon. By some surgeons gloves are employed to protect themselves in the manipulation of septic cases, and they are not used by them in "clean" cases. The protection afforded to the patient by the use of gloves may be readily demonstrated by taking bacterial cultures from the moisture of the palm of the hand, after a long operation in which gloves have been worn (the preparation of the hands before operation having been as thorough and careful as if gloves were not going to be worn). In such circumstances an abundant growth of staphylococci has been obtained by various observers. Some surgeons have objected to the use of gloves, laying stress on their inconvenience and disadvantages, especially in the impairment of the sense of touch. This, according to Mr. Moynihan,[1] is not the fault of the gloves, but is due to the lack of knowledge of the proper method of putting them on. Using gloves which fit fairly tightly, and after they have been boiled for twenty minutes, he puts them on in the following way:—"The opening in the glove is held stretched wide by two fingers, and the glove is filled, by a movement of 'scooping,' with sterile salt solution, which fills the basin in which the gloves lie. When the glove is nearly filled with water, it is held in one hand while the other hand gently wriggles into it. As the hand enters water escapes until the fingers have reached to within about an inch of the top. The cuff of the glove is turned backwards, and the glove is held from the inside. It is only after the sterile sleeves have been put on that the glove is turned over on to the forearm. Then the other glove is filled and put on in exactly the same way. The further pulling on of the gloves is impossible, but they may be made to go on rapidly by stroking them from the fingers to the wrist with dry sterile gauze. The glove when fully on should be perfectly tight, but should not be so tight as to hamper the

[1] *Abdominal Operations*, p. 27.

movements of the hand. *The outside of the glove should never be touched with the opposite hand*, which, though scrupulously prepared, should be considered, as it doubtless is, capable of infecting the glove, if friction is used." The italics are ours, for it is against the commonest fault which is committed in putting on gloves that this caution is needed.

The glove-covered hand should be frequently rinsed in sterile salt solution, not only when soiled, but also in order to keep it moist. It is easier to work with a wet glove than with a dry one.

If a glove is pricked or torn during an operation, the opening must at once be closed, either by a finger stall or a glove finger, or a fresh pair of gloves must be used.

It is obvious that the results obtained in abdominal surgery should theoretically be improved by the regular use of gloves. Their employment involves some trouble and some extra expense. Do the results actually obtained prove, as a matter of practical experience, that their use does really bring about the expected improvement in results? It is a very difficult matter to find any data, consisting of facts and figures, apart from merely personal impressions. A paper in the *Journal of Obstetrics and Gynæcology* for December 1905, by Dr. T. B. Grimsdale, is of very great value in this respect. Dr. Grimsdale points out that recent improvements in operative technique have almost banished the mortality of even formidable surgical operations. The mortality test, therefore, is no longer of value. The test, which demonstrates the ease and rapidity with which patients recover after operation, is the only one which now possesses any value. He also considers that the only fair way in which a comparison on this point can be made is to compare the results of the work of one man before and after adopting the practice of wearing gloves. He has made some composite charts of the temperatures and pulses recorded during the recovery of patients after abdominal operations, so that a comparison may be made of the ease of recovery under the different methods used by himself in 120 abdominal operations. These were performed for the ordinary run of gynæcological diseases, no selection of cases being employed.

They are arranged in three series, each comprising forty

operations. In the first series the antiseptic method was employed, in the second series the aseptic method, and in the third series gloves were used.

The pulse-rate is considered to be a better index of the patient's progress towards recovery than is the temperature curve.

It is, he says, interesting and gratifying, in making these comparisons, that there has been a steady improvement with each change in the method of operating, the best results of all being obtained where gloves were used.

There is no doubt that surgeons who get good results without using gloves will have still better results if they adopt the practice of wearing gloves during the performance of their coeliotomies, and we agree with Dr. Grimsdale that it is a pity to be content with anything short of the best that can be attained.

A CASE OF INFANTILISM.

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[With Plate XIII.]

CONSIDERABLE attention has of late years been drawn to the subject of infantilism, mainly by the writings of Mr. Hastings Gilford,[1] who has distinguished a special group of cases as "Ateleiosis," and by the description by Dr. Byrom Bramwell[2] of a remarkable form of infantilism, associated with, and apparently due to, pancreatic deficiency. The following case presents points of interest in relation to both of these varieties, which will be commented on after it has been narrated :—

Ada C., æt. 27, single, domestic servant, was admitted into the General Hospital, Nottingham, on November 7, 1905. A complete history of the patient's antecedents could not be obtained, as, partly owing to her weak state, and partly to natural dulness, she could give but a poor account of herself, while her mother was an ignorant, unobservant charwoman, and the father a drunken groom who had deserted his wife. Both parents, and their only other child, a brother, who was a barman, were of ordinary size. There was nothing definite pointing to syphilis in either patient or parents. The patient said that she had left school at the age of 12, owing to constant headache, being then in Standard III., and, therefore, obviously backward. There was no history of previous illness, accident or shock, and she said she had always been well until two years ago. Up to that time she had been for some years in service as nurse to a child in a public-house. There was no history of personal alcoholism. She had never menstruated. All her life she had been rather liable to diarrhœa until her present illness. Two years ago she began to suffer from thirst, hunger, loss of flesh, and general weakness, and to pass an excess of urine. She had been treated in the out-patient room for diabetes for a few months. During the last six weeks she had become much worse, her appetite failed, and she suffered from frequent pains across the lower part of the abdomen.

Present State. November 12.—The patient is a small,

emaciated woman, 4 feet 3½ inches in height, and weighing 3 stones 8 lbs. The face is juvenile, resembling that of a girl of 11 or 12, but also pinched and worn, and with a suggestion of age in it.

See Figs. 1 and 2. — The mental condition is only moderately good, and somewhat child-like. There seems no feeling of sexual shyness, and she shows not the slightest objection to any examination. The skin is pale and dry, but the mucous membranes are not markedly anæmic. The shape of the head is not remarkable, the teeth are poor and widely separated, but not pegged or notched. The gums are spongy and retracted, the tongue dry and red. The hair of the head is of fair length, but fine and dry like that in myxœdema. The eyebrows are well developed. The pubic hair is absent, but there is hair on the labia majora. The mammæ are totally undeveloped and the hips are rather of the male type. The external genitals are like those of a female child of about 10, except that there is an abnormally large clitoris. There is no enlargement of the thyroid, lymphatic glands, liver, or spleen, and no abnormal pigmentation. The limbs are normally developed, but the musculature is poor: notably, the glutei are almost absent. The abdomen is rather prominent. The heart and lungs appear normal. There is a large furuncle on the right temple. There are no signs of disease of the nervous system, and the fundi are normal. The patient passes from 5 to 6 pints of urine daily, containing from 2 per cent. to 3 per cent. of sugar, but no albumen. The di-acetic acid reaction is present.

Throughout her stay in hospital she was extremely constipated, the bowels only being opened by enemata in addition to purgatives. The stools were composed of rather pale and dry scybala, contained 11·9 per cent. of fat, and muscle fibres were not found in them. The temperature varied from 98° to 100° during the first week, and then gradually sank to 96° on the 10th day after admission, when, having gradually grown weaker and drowsier till she passed into coma, she died.

The association of infantilism with diabetes suggested the possibility of the case being one of pancreatic infantilism; but, before a complete investigation could be made or treatment given a fair chance, she died. The fact that the

Fig. 1.

Fig. 2.

stools contained no excess of fat and no muscle fibres contra-indicated serious pancreatic disease. For the first 5 days after admisssion, the patient took ordinary food, and was then put on to diabetic diet, with a pint of milk daily. She, however, had great difficulty in taking the diet, and for the last few days lived mainly on milk, beaten up egg, and plasmon. It was intended to administer pancreatic extract, but she died before the treatment was fairly started.

I regret that owing to the grave state of her illness no skiograms of the limb bones were taken.

Autopsy.—Fifteen hours after death. Subcutaneous fat absent.

Lungs.—Normal except for recent pneumonic consolidation at the right lower lobe and a single old tubercular (?) nodule at the left base.

Heart.—Small, weighed 6 ozs.; muscular substance normal. There were some atheromatous patches on the aortic and mitral valves and in the aorta.

*Liver.**—Of normal appearance, weighed 2 lbs. 7 ozs. Under the microscope considerable fatty infiltration of the liver cells was seen.

Spleen.—Weighed 2½ ozs. Microscopically there was noted decided increase of the fibrous stroma with atrophy of the malpighian bodies and fibroid thickening of the walls of the small arteries. Capsule rather thick.

Pancreas weighed just under 1 oz., and was of normal length, but flatter and narrower than usual. Microscopical sections showed considerable fibroid thickening of the sheaths of the smaller ducts, and some increase of the fibrous stroma of the lobules leading to partial atrophy of the acini. Some of the arteries also showed thickening of their walls, especially of the intima. As a whole, however, the gland cells presented a fairly healthy appearance, and Mr. Targett, to whom the sections were submitted, considers that the lesion of the pancreas is "peculiar and not like the cirrhosis of diabetes."

The Mesenteric Glands were of a peculiar yellow colour, to the naked eye suggestive of fatty change, but under the microscope showed only great increase of the fibrous stroma.

* The histological report is based on sections prepared by the Clinical Research Association.

The Kidneys were large, weighing 5½ oz. (right), and 5 oz. (left). The cortex was thicker than usual, and rather pale. Under the microscope the glomeruli and tubules appeared fairly normal, but there was considerable thickening of the internal coat of the larger arteries.

The Supra-Renal bodies were of normal area, but unusually thin and yellow. The microscope showed considerable vacuolation of the cells of the cortex, such as is met with in old age.

Thymus was completely atrophied.

The Thyroid weighed under 1 oz. Microscopically some quite normal follicles full of colloid were seen, but many were small and some devoid of that substance. There was a marked increase of fibrous tissue, both of the interlobular septa and of the stroma surrounding the follicles, some of which were completely atrophied.

The Pituitary Body was normal to the naked eye. Under the microscope there was a well-marked increase of fibrous tissue in the glandular portion, but on the whole the appearance of the gland cells was normal.

The Stomach and Intestines were normal.

The Brain was normal to the naked eye, as was a microscopical section of the cortex of the parietal region.

Rib.—Sections were cut at the junction of a rib with its cartilage, and the report of the Clinical Research Association states that "the parachondral zone is very spongy—the cancellous spaces being large and filled with vascular marrow. There are, however, no signs of absorption, such as the presence of osteo-clasts. The appearances are suggestive of the 'senile atrophy' of the rib, which is frequently met with among lunatics."

Generative Organs.—It was here that the most remarkable departures from the normal were observed. Nothing that could be distinguished as *ovary*, or *testis*, could be found. If present at all, they were overlooked in a careful search.

The Uterus was quite undeveloped, being represented by a small T-shaped body, 1 inch long by ⅛ inch broad, attached along its whole anterior surface to the back of the bladder.

Fig. 3 is an outline sketch of the uterus, showing part of the right and the whole of the left Fallopian tube. The tubes were nearly 3 inches in length, and each ended in

fimbriated opening. No trace of ovary, or parovarian body, was found near it. There was a small vagina, which just

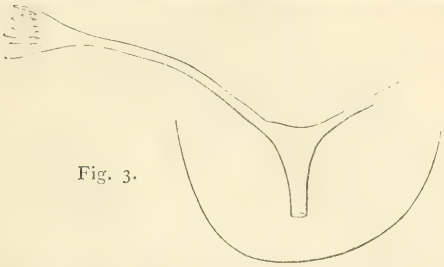

Fig. 3.

admitted the finger. The uterus could not thus be felt, but on cutting open the vagina a small slit-like os uteri was seen. A cross section of the body of the uterus showed a lumen which just admitted a pin.

COMMENTARY.

This is a case of persistence of infantile characters in the main, with some premature senile changes, associated with entirely undeveloped sexual organs. The diabetes may probably be put aside as a cause of her condition previous to the last two years, and neither the clinical, nor the anatomical, findings indicate a primary lesion of the pancreas. Thyroid insufficiency has been considered by French writers as the main cause of infantilism, but there is no evidence that in this case it was present to a marked degree. The pituitary body is usually enlarged in acromegaly and some cases of gigantism, has been found shrivelled in some dwarfs, and to it has been assigned an important influence on growth by Woods Hutchinson ;[3] but it was normal, except for the slight fibrosis described, which was common to it and to several other organs.

The supra-renal bodies, which embryologically arise from a cell mass in close relation to the germinal epithelium, from Wolffian body cells (both cortex and medulla alike, according to the latest researches[4]) have some obscure and curious relation to growth, as is shown by cases of precocious sexual development associated with tumours of those organs (Bulloch[5] and Adams[6]). But in this case they were at most a little wasted, and their appearance suggests senile changes rather than developmental inadequacy. We are driven back on the

lack of sexual glands as the most prominent single feature of the case, and are tempted to find a casual relation between their absence and the other phenomena. There are, however, obvious difficulties to this view. Hypoplasia of the generative glands has been met with without infantilism, and their removal during childhood does not produce the same symptoms. This case appears to come into Mr. Hastings Gilford's variety of Asexual Ateleiosis, in which the development of the sexual organs has been arrested at a very early stage before birth, while the other organs have advanced to a higher stage. The general development of the body and the secondary sexual characters have remained child-like, but the other organs are in no sense infantile and rather show premature senile changes, *e.g.*, atheroma, endarteritis, fibrosis of thyroid, pancreas, spleen, mesenteric glands and pituitary body.

It thus resembles two remarkable cases described by Mr. Gilford as Progeria,[7] in which the extreme characters of old age were observed at the ages of 14 and 15, and in which death occurred at 18 and 17 years of age.

One of Dr. Bramwell's cases of infantilism, associated with chronic diarrhœa* (but no pancreatic defect), also showed senile changes in the teeth and gums such as are usual at the age of 60. In the present case the non-development of the sexual glands must have had an effect in modifying growth, but there has clearly been, behind all, some lack of vital energy in the germ cells, which led to incomplete development and premature decay. The diabetes I look upon as a late phase, associated with the tendency to degeneration, and not as a primary cause of the undeveloped or ateleiotic condition.

* It may be noted that a tendency to diarrhœa was a feature of this case before the onset of the diabetes.

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SYNOPSIS OF RECENT PROGRESS IN OTOLOGY.

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The present year has not produced any very striking advances in the science of otology, but it has nevertheless been demonstrated that Otology in England is showing a tendency on the part of its exponents to greater activity. The increased employment of tuning forks in the diagnosis and prognosis of ear disease, the researches into its pathology, and the employment of such measures as vibratory massage, all show an earnest of still better work in the future. One may be allowed to point out the extreme difficulty of researches into the pathological anatomy and the elucidation of symptoms in ear disease, excluding those which have their origin in the effects of suppurative conditions. It is but seldom that the aurist has the opportunity of examining the parts microscopically after death, and when these opportunities do occur, the disease is not localised to any small part of the labyrinth or its capsule, but has become general through the lapse of time. This necessitates the constant formation of hypotheses, which is a most unsatisfactory way of dealing with disease. Suppurative disease of the ear necessarily forms the subject matter for the majority of communications, and while suppurative disease of the labyrinth has only of recent years received its due consideration in this country, it will now be conceded that it is fully understood here. Amongst the more recent methods of treatment in acute cases may be mentioned that of Bier. This treatment consists in the production of an artificial hyperæmia by various means, and in otology it is obtained by compression of the superficial veins by means of a rubber bandage around the neck. The following abstracts are taken from amongst the noteworthy papers that have appeared during the year.

Iwanoff (*Arch. f. Ohrenheil.*, Band 68, p. 63). This writer has observed three cases in which there was a cyst-like swelling of the epidermal sheath of the mastoid wound. In two other cases, cholesteatomatous disease appeared within three years

of the performance of the operation, and in one case this was associated with mycosis. During the present year several cases have been reported in which paralysis of the abducens occurred as a complication of middle-ear disease, one by Hastings (*Archives of Otol.*, Vol. XXXV.) and three by Rimini (*Archives inter. de Laryngol., Otol. et Rhinol.*, 1906, No. 1). In neither of the latter was the labyrinth affected, and the condition appeared to have been due to extension of inflammation from the ear.

Kander (*Archives f. Ohrenheil.*, Band 68, p. 69) writes on the disturbance of the function of taste in ear disease. When the chorda tympani is destroyed or injured, the anterior portion of the tongue is affected. When the tympanic plexus suffers, the taste fibres of the posterior third of the tongue and some of the surrounding parts are involved. The latter is usually affected in purulent inflammation, while the chorda tympani is destroyed in most operations involving removal of bone, or of the ossicles.

Spencer (*New York Med. Jour.*, March 1906) reports a case in which alarming hæmorrhage occurred after paracentesis. It recurred twice, but was eventually controlled, and he attributed it to an aneurysm of the middle ear, though there appears to be no conclusive proof that this was the condition present. The case is, however, interesting, and worthy of note.

Primary caries of the mastoid process in children is discussed by Gamgee (*Lancet*, May 5, 1906). He states that in 10 cases out of 61 primary caries of the mastoid was found, and he considers that these cases are characterised by the frequent absence of discharge and painless formation of the abscess. He believes that they are due to primary caries, which may be either in the upper part of the masto-squamosal line, when the middle fossa will be exposed, or in the lower portion of this line, when the mastoid will be much involved.

And primary tubercular disease in children is referred to by Isemer (*Archives f. Ohrenheil.*, Band 68). The most important points that he brings forward are: that at least 13 per cent. of all cases of mastoiditis in children are tubercular, that half of these are primary, that the disease is slow and insidious in its onset, and that the objective appearances are not as a rule pathognomonic of tubercle.

Eagleton (*Archives of Otol.*, Vol. XXXV.), in reporting

a case in which the jugular had been ligatured for sinus thrombosis, says that, after the ligation, there was profuse hæmorrhage in the mastoid wound, with intense optic neuritis, followed by collapse and death. He deduces from this that it is essential to take every possible precaution in order to avoid such complications.

A. S. Gray (*B.M.J.*, November 4, 1905) gives the results of autopsy in a patient, who died from cancer of the uterus, and who suffered from bilateral deafness and tinnitus for 14 years. The cranial bones were very soft, there was no abscess, tympanic inflammation, perforation, or exostosis. There was bilateral ankylosis of the stapes, and adhesions of articulations on left side. On section, the cartilage was found to be affected, and the medullary spaces were larger than normal. The spiral ligament was atrophied on both sides, as were also the cochlear nerves. Calcareous deposits were present on both sides.

Baramay (*Jour. de Laryngol., Otol. et Rhinol.*) expresses the opinion that a sensation of rotation is produced only by excitation of the labyrinth, and not by excitation of the semicircular canals. If nystagmus is present, the sensation is markedly augmented on looking towards the side affected, and diminished on looking towards the opposite side. He believes that the sensation of rotation is related to the nystagmus, the latter being produced by reflex excitation of the vestibular apparatus.

G. L. Whitehead, at the Otological Society of Great Britain, reported three cases of cerebellar abscess, in which the disease spread by way of the triangular bony surface, limited above by the superior petrosal sinus, in front by the posterior semicircular canal, and behind by the lateral sinus, this route being followed in nine cases out of twenty-three observed by the writer. In all three cases, the radical mastoid operation was performed. In the first two cases, there was severe long-standing otorrhœa, associated in the second case with ulcerative keratitis, and consequent destruction of both eyes. The following conditions were found on operation:—Considerable disease of the triangular surface above described, a small extradural abscess, and a cerebral abscess, from which a considerable quantity of pus was evacuated. In the second case death supervened in a few hours. In the third case, in

which otorrhœa had existed only for three weeks, a small abscess of the temporo-sphenoidal lobe was opened and drained, with temporary improvement. Three weeks later, however, another abscess was incised in the same region, and the patient died five weeks after the first operation. Post-mortem, a small cerebral abscess was found, and the route of the infection was shown to be that of the internal ear and external auditory meatus.

R. Lake (*West Lond. Med. Jour.*, April, 1906) described a certain variety of deafness, due to fatigue or weakness of the auditory nerve, sometimes associated with general troubles of the excretive, digestive, or circulatory system. The diagnosis being frequently very obscure, it is necessary to make a minute examination of the hearing with tuning-forks, Politzer's acoumeter, and the Galton whistle. Gellé positively shows mobility of the stapes. Diagnosis is facilitated in cases in which there is complete absence of bone conduction, associated with good hearing for the human voice, the acoumeter, and the whistle. The writer has obtained excellent results from treatment of the general condition in six cases, in which gout, neurasthenia, and other general maladies were the cause of the disease in the ear, and has a seventh patient under observation, in whom improvement can be demonstrated. In addition suitable local treatment should be employed.

Yearsley (*Lancet*, April, 1906) reports an unusual condition following a mastoid operation. At the time of operation it was found that the dura mater was perforated. Shortly afterwards the temperature rose, the patient becoming restless, and suffering severe pain. He gradually passed into a condition of acute dementia, calling out loudly, and being extremely restless. A second operation was performed, which revealed the presence of a cerebral hernia, the protruding mass being gangrenous. This was removed, and a small cerebral abscess evacuated. The patient wasted away extremely, and was only kept quiet by very large doses of various sedatives. The dressings were usually done under an anæsthetic, and the patient eventually completely recovered.

L. Katz (*Zeitschr. f. Ohrenheil.*, Band 68, Heft 1 and 2, p. 122). Otosclerosis in the Cat.—In otosclerosis we are dealing with a dessicative ostitis, tending towards lacunar reabsorption of the firm bone, and its replacement by a new

hyperostitic mass. It produces new medullary spaces, and after many stages finally leads to osteoporosis. Ankylosis of the stapes frequently occurs. Dr. Katz showed microscopical specimens from a deaf cat, in which the pathological process had extended from the capsule of the labyrinth to the neighbouring bone, especially the malleus and incus. The annular ligament was intact and there was no ankylosis. He believed that, if the disease could be diagnosed during life in animals, such as the dog and cat, experimental research could be undertaken which would benefit the human subject. Post-mortem there was found in this cat a pathological anatomical picture similar to that described by Volkmann as ostitis chronica vasculosa ossis temporis. He considered that it was advisable to undertake further research, with regard to the fact that ankylosis of the stapes is not always the pathological anatomical substratum for otosclerosis. Possibly osteomalacia, syphilis, or senile atrophy of the bone may precede this form of otosclerosis. He emphasises the importance of the rational treatment of nervous disturbances in otosclerosis.

Lake (*Lancet*, January, 1906) describes what he considers to be the correct method of operating on the vestibule for the relief of vertigo. It is briefly as follows:—After having exposed the external semicircular canal, its upper surface is cut away with an electric burr until the membranous canal is opened up. This is then followed up anteriorly and posteriorly to the vestibule. The bone intervening between the openings is cut away, and the opening thus formed enlarged to its fullest dimensions. All the exposed parts of the vestibule and ampullæ are carefully curretted with a fine currette, and the foot-plate of the stapes removed, this completing the operation. The facial nerve, lying sheathed in bone, forms a bridge between the two openings into the vestibule. By means of this operation, an opening is made into the widest part of the vestibule, giving the greatest freedom for curretting. The writer states that, by making a free entry into the vestibule in the manner described, the serious shock which was observed in Milligan's and his own earlier operations is avoided.

Rhese (*Deut. Med. Wochens.*, April 19, p. 625). Participation of Internal Ear in Injuries to the Head.—In a hundred cases of injury to the head, the writer found very

considerable abnormalities in the hearing power on the employment of delicate means of investigation, although no impairment of hearing was observed on testing by the human voice. The patients were all young people, in whom senile changes could be excluded. He believes that the internal ear participates in most cases of injury to the head accompanied by concussion, and states that examination immediately after the accident shows a constant symptom complex, comprising nystagmus, interference with bone conduction, shortening of perception for the entire range of tones, irregularities in perception of the different tones, simultaneous affection of both ears, marked decrease in ability to hear the watch as opposed to ability to hear the voice, easy fatigue for tuning fork tones, Rinné positive, marked dilatation of vessels along roof of auditory canal.

J. E. Logan (*New York Med. Rec.*, March 24, p. 487). This is a case of a man who was shot in the right ear, the bullet passing from the right shoulder and entering the external meatus lodging in the middle floor of the ear. Facial paralysis and suppuration of the middle ear ensued. On operation a fistulous opening was found beneath the lobe of the ear, allowing some of the discharge to pass through this channel. There was much necrosis. All necrosed bone was removed, and the patient made a rapid recovery.

Dupont (*Archives de Laryngol., d'Otol., et de Rhinol.*, January–February 1906) has performed experiments upon the electric ray and the dog fish, with the object of producing disturbances of equilibrium similar to those observed in pigeons, when lesions exist in certain parts of the ear. The results obtained are as follows:—(1) A lesion in the semicircular canals determines disturbance of active equilibrium and of active movement. (2) In his experience, whilst lesion of the canal produces static disturbance, lesion of the ampullæ excites the motor centres and produces a vicious circle, that is to say, that in the former case the trouble is a passive, and in the latter an active one. (3) The disappearance of these troubles after a time indicates that there is an attempt by another canal (possibly that on the opposite side) to perform the functions of the one injured.

George Shambaugh (*Archives of Otol.*, Vol. XXXV., No. 1, p. 11). Blood Supply of the Internal Ear.—The writer

considers that sufficient stress has not been laid upon the fact that disturbances in the circulation of the labyrinth may be limited to one or other of the terminal arteries supplying certain areas without involving the remainder of the labyrinth. He refers to the view, recently advanced by Alexander of Vienna, that communications exist between the blood-vessels of the middle and internal ear, and has himself proved that the branches of the labyrinthine, supplying the endosteum, penetrate the bony capsule at various points, chiefly about the base of the cochlea and the vestibule, and that, in the ear of the calf, communications exist between the blood-vessels to the mucosa of the cavum tympani and those of the membranous labyrinth and endosteum. In otosclerosis, communications between the blood supply of the capsule and the internal ear might result in alteration in the circulation which might account for the presence of tinnitus.

Guiseppe (*Tricomi-Allegra*, February 24, p. 463, *British Medical Journal*).—At the meeting of the German Anatomical Society, the author demonstrated experimental researches, which he had carried out on dogs, cats, guinea-pigs and rabbits, with reference to the association between the nerve elements of the ears, eyes, and cerebellum. From the results obtained, it appears that the cochlear root of the eighth nerve is connected with the nerve nuclei and other nuclei of the pons and mid-brain alone, and the vestibular root with the cerebellum.

Robert Barnay (*Archives f. Ohrenheil.*, Band 68, Hefte 1 and 2, p. 1).—From the writer's researches on nystagmus, with reference to the diagnosis of aural diseases, he comes to the following conclusions:—(1) Nystagmus is not marked in unilateral disturbance of the vestibular apparatus. (2) In bilateral disturbance of the vestibular apparatus, the presence of nystagmus confirms the diagnosis. (3) In cases of vertigo, or simulated vertigo, a single examination with regard to nystagmus will often furnish proof that an organic cause underlies the symptom, whilst repeated examination gives certainty as to whether the case is one of simulation or neurosis. On this account the result of such an investigation is valuable in legal cases.

THE ESTIMATION OF THE FUNCTIONAL VALUE OF THE KIDNEYS.

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No more striking evidence of the keen desire for increased accuracy in diagnosis and prognosis in modern surgical work is to be found than in the persistent and laborious attempts which have been made in order to arrive at a trustworthy method of estimating the functional value of the kidneys.

In surgical operations, and especially in those connected with the urinary organs, a failure of the renal function is responsible for a certain proportion of the death rate.[1] The consciousness of this fact is a source of anxiety to the surgeon who proposes to operate where known renal disease is present, and this anxiety is accentuated when the operation concerns some part of the urinary apparatus; it becomes acute when a kidney is the object of the surgical attack. Practical investigations in this field must, therefore, follow two paths.

An estimation of the total renal function is desirable when any operation is proposed in the presence of known renal disease, and again when operative interference becomes necessary for disease at some part of the urinary tract in which renal damage from back pressure, or from sepsis, is known or suspected.

On the other hand, when the kidney itself is the object of surgical interference, information is desired in regard to the functional power of the second kidney, and for this object it is not only necessary to find a means of measuring the renal function, but there must also be at hand some method of separately observing the work performed by each kidney. To this end various methods of separating the urines of each kidney have been introduced and are now in use. These

[1] Kümmel states that while he had six deaths from insufficiency of the second kidney in his earlier work, he has had no deaths from this cause since he employed the modern methods of diagnosis.

methods I have fully discussed in a previous issue of THE PRACTITIONER (June, 1905).

At the recent Congress of the Société Internationale de Chirurgie at Brussels (September 1905) these questions took an important place in the discussion upon the diagnosis of the surgical diseases of the kidneys. I purpose, therefore, to make some notes of the views advanced by MM. Albarran, Kümmell, and Giordano, who introduced the subject for discussion.

I.—WHAT IS THE VALUE OF THE TOTAL RENAL FUNCTION?

Until recent years, surgeons have been content in their examination of the kidneys of patients to note the sensibility, size, and mobility of the organs, and to rely upon this, and upon a more or less careful analysis of the urine, for the purpose of forming an estimate of the renal function. Such information as may be based upon these factors must be of a somewhat varying character. The examination of the urine is that from which the most trustworthy data may be gained.

Chemical Analysis of the Urine.—The analysis does not give precise information in regard to the urinary excretion, but, in spite of its imperfections, it has considerable importance.

In chronic pyelonephritis, the proportion of the principal normal constituents of the urine is habitually lowered, and, according to Albarran, the amount of the diminution is proportionate to the extent of the renal disease. But the various constituents of the urine do not suffer the same diminution.

According to Albarran's investigations, which have been confirmed by the careful work of Chabrié, the quantity of urea excreted in 24 hours is always diminished in cases of long-standing urinary disease.

The average figures are 13 or 14 grammes of urea in 24 hours, in healthy men, aged from 60 to 75 years. In cases of bilateral pyelonephritis, the figures sometimes fall to 7 or 8 grammes in 24 hours. In a general way, the amount of urea increases in these patients as the urinary secretion

increases, sometimes where there is improvement the amount of urea increases even where the quantity of urine falls. In very grave cases the quantity of urea excreted in 24 hours may fall to 3 or 5 grammes.

The elimination of uric acid is often feeble in pyelonephritis. This was pointed out by Guyon, and established by Chabrié. In these patients, the excretion of phosphoric acid is a little increased and similarly the output of sodium chloride rises (Chabrié). Sometimes, Albarran states, there is a diminution of urea while the excretion of sodium chloride is unchanged.

The estimation of the quantity of albumin present in the urine is of importance, not for the purpose of establishing the presence of renal insufficience, but of aiding the diagnosis of the lesion which determines the insufficiency.

Albuminuria is constant in pyelonephritis, but it never attains a high degree even in the gravest forms of renal lesion.

Albumin is present, in traces, in certain diseases only; a very large number have from 50 centigrammes to 1 gramme per litre. It is exceptional to find 2 or 3 grammes per litre.

When the amount of albumin exceeds 2 to 3 grammes per litre on several successive days in a patient suffering from urinary disease, one may say that the condition is not a simple surgical nephritis.

In order that these observations should have a definite value, the analyses must be carried out on several consecutive days.

Density of the Urine.—This method of examination of the renal excretion furnishes information which is too vague to be of use in estimating the renal function.

Cryoscopy.—In recent years, the molecular concentration of the urine has assumed a certain importance as a measure of the renal function. The following note upon this subject is from the monograph of Professor Casper.

The theoretical foundation of the new diagnostic method, so far as it is of importance in this relation, is shortly as follows:—

The secretory activity of the kidneys changes the existing relations between the dissolved substances and the solvent in the urine and in the blood and lymph. Between the blood

and the urine, there is a constant exchange through the separating membranes, the capillary wall, Bowman's membrane, and the epithelium of the tubules. This exchange is governed by the physical laws of osmosis. The power of attration of one form of solution upon another is called its osmotic pressure. The osmotic pressure is proportional to the molecular concentration of the solutions, and is, as Dresser has pointed out, most simply demonstrated by the determination of the freezing point. The richer in molecules a substance is, the deeper lies its freezing point under that of distilled water and *vice versâ*.

The kidneys have, according to Dresser, the task of lowering the osmotic pressure of the blood, hence, under normal conditions, the freezing point and also the molecular concentration of the urine are greater than that of the blood. On the other hand, diseases, and especially diseases of the kidneys, can reduce the power of the kidneys to bring about a change in the osmotic tension of the fluid passing through. Then the freezing point of the urine approaches that of the blood. We owe to Koranyi the introduction of this method into practice. Dresser's estimation of the osmotic pressure of the kidney is too complicated for practical use.

Albarran recommends the apparatus of Bosquet for clinical work.

The apparatus consists of a glass jar which should be completely filled with a freezing mixture of ice and sea-salt. In this jar is placed a large glass tube containing equal parts of water and glycerine; this is a conducting medium which does not freeze. In the interior of this tube is a smaller glass tube which contains the fluid, the freezing point of which it is desired to ascertain. This tube is retained in the larger by a rubber ring. In this inner tube are a thermometer and a platinum stirring rod.

In order to ascertain the freezing point of a fluid, a sufficient quantity is placed in the inner tube to cover the bulb of the thermometer, the glycerine is placed in the outer tube and the freezing mixture in the jar.

By means of the platinum rod, the fluid is stirred from time to time, and, as the thermometer approaches zero, the stirring should be continuous. As a result of the agitation,

the column of mercury descends several points below the freezing point of the urine. When one sees that the probable point of freezing is passed, the stirring is stopped and a morsel of ice is thrown into the urine. The mercury immediately rises to a maximum point where it remains stationary for a minute and then descends anew.

The freezing point (point △) of the urine corresponds to this maximum point.

The study of the freezing point, or point △, furnishes an easy means of recognising the molecular concentration of the urine, whatever may be the nature of the substances dissolved in it.

The point △ gives us a figure which shows considerable variation in the normal state. According to Koranyi, the △ of normal urine lies between − 1·30° and − 2·20° and will vary, when the patient has drunk much or perspired, from − 1° to − 2·30° and more.

Dresser (*Archiv. f. exp. pathol. u. pharmakol.* 1892, 303) has shown that after copious libations, the freezing point of the blood may be lowered 1°. Sougues and Balthazard have seen the point △ of the urine lowered to − 0·17° in a case of nervous polyuria. Weil (*Monatschr. f. Harkrankh. u. Sex. Hygiene*, 1904, No. 1) has even observed a lowering of the freezing point to − 0·6° and − 0·5° after the ingestion of quantities of fluid.

The simple determination of the freezing point of the urine cannot inform us as to the state of the renal function.

Even when one reckons the total volume of urine, the study of the point △ does not give more precise information than the estimation of the density. Cryoscopy has the single advantage over the measurement of the density that it indicates the entire dissolved molecules, without being influenced by the nature of the molecules, as is the case in the measurement of the density.

In reality, the △ of the urine does not give us the exact measure of the molecular concentration of the urine; a certain part of the salts in solution is precipitated during the freezing of the liquid. Zangemeister (*Berl. klin. Wochensch.* 1903, No. 49) has shown that, in order that the point △ of two urines may show a comparison of their

molecular concentration, it is necessary to dilute the fluids so that they may attain to the same volume, and that all the salts may remain in solution during the freezing.

It has been tried to draw, from the cryoscopic examination of the urine, conclusions in regard to the functional power of the kidneys by combining the study of the point Δ with a certain number of other factors.

The following five methods are of this nature:—

1. The method of Koranyi, who studies the Δ of the urine and the quantity of the sodium chloride.

2. The method of Claude and Balthazard in which one takes account of the two preceding elements, and, in addition, the volume of urine passed in 24 hours, and of the weight of the individual.

3. The method of Claude and Mauté, based upon the elimination produced by the ingestion of sodium chloride.

4. The method of Teissier, which estimates the spontaneous alimentary chloriuria.

5. The method of Bernard, who studies the cryoscopy of the urine and compares it with that of the blood.

Of the method of Koranyi, Albarran says it is almost abandoned in general medicine, and that nothing justifies its employment in urinary surgery.

The method of Claude and Balthazard is more precise, but is also open to criticism. This observer does not believe that the formula has been sufficiently applied to the study of the renal function in patients suffering from surgical diseases of the kidneys.

In order to test the efficiency of the method, Albarran has applied it to the investigation of the renal function in 21 cases of surgical renal disease. The results were controlled in most cases by other methods, such as chemical analysis, methylene blue, phloridzin, glycosuria, cryoscopy of the blood. The results obtained were as follows:—

1. The cryoscopic formula gave results in accord with those of other methods which should be considered trustworthy in six cases.

2. In four other cases, the cryoscopic formula showed that no renal insufficiency existed, being in accord with the

chemical analysis, the clinical state and the cryoscopy of the blood, although twice methylene blue and once phloridzin have shown a poor renal permeability. These observations should be reckoned to the credit of cryoscopy.

3. In six patients, the cryoscopic formula gave false results in disaccord with the clinical and other methods of investigation.

In the five remaining cases, the cryoscopy was not controlled by other methods, but it was repeated. There was reason to suppose that, in four cases, the cryoscopic indications corresponded with the real state of the renal function. It was not so in the fifth. In three analyses on three successive days, there was a marked insufficiency of the molecular diuresis with true renal insufficiency on the first and third days, in spite of the second day's examination showing an almost normal renal function. These results show that absolute confidence cannot be placed in the formula of Claude and Balthazard. For although in 67 per cent. of the cases examined it gave indications corresponding to the real state of the kidneys, yet in 33 per cent. it gave results that would have led to erroneous conclusions.

Cryoscopy of the Blood.—The cryoscopy of the blood such as Kummell employs, is a useful method in urinary surgery, but the examination of the blood considered alone may lead to false conclusions. Albarran cannot accept the rules laid down by this surgeon, who gives the figure Δ of the blood $= -0{\cdot}60$ as the limit for nephrectomy. Nor does he accept the conclusions of Kummell and Rumpel, which are as follows:—

1. When the kidney is intact, the molecular concentration of the blood by means of the prompt renal regulation is constant and corresponds to a freezing point of $-0{\cdot}56°$.

2. When there is bilateral affection of the kidney, there follows an increased concentration of the blood proceeding parallel with a diminution of the concentration of the urine.

3. A unilateral affection of the kidney does not cause any disturbance of the total function expressed by the elevation of the molecular concentration of the blood and a diminution of the molecular concentration of the urine.

4. When the molecular concentration of the blood is normal,

there is no general disturbance of the function. A disturbance is most usually present in connection with a bilateral lesion, and a raising of the concentration leads to this supposition.

According to Albarran, these conclusions are too rigid, and he makes the following criticisms :—

1. The lowering of the Δ of the blood to $-0{\cdot}60^{\circ}$ and beyond may be independent of any renal lesion. Kümmell and Rumpel themselves recognise the possibility of this happening in various circumstances ; in uncompensated affections of the heart, diabetes, eclampsia, epileptic attacks and in large ovarian cancers.

In all these cases accumulation of carbonic acid in the blood from respiratory insufficiency may determine the lowering of the Δ of the blood.

In such cases one could, perhaps, eliminate the cause of error by passing a current of oxygen through the blood to be examined.

Similarly, diabetes may lower the freezing point of the blood to $-0{\cdot}67^{\circ}$ (Senator), and even to $-0{\cdot}80^{\circ}$ (Bernard).

The lowering of the Δ of the blood by disturbances due to the local circulation of the kidney is shown by a case of pyonephrosis recorded by Koranyi, in which the point Δ was $-0{\cdot}68^{\circ}$ before operation, and fell after nephrectomy to $0{\cdot}57^{\circ}$. Similarly, in a case of neoplasm of the kidney with a normal second kidney, Moritz found the point Δ was $-0{\cdot}61^{\circ}$.

Wiebrecht records the case of a man with a large carcinoma of one kidney, in whom the Δ of the blood was $-0{\cdot}60^{\circ}$, and after nephrectomy, $-0{\cdot}58^{\circ}$. At the autopsy, several weeks later, a metastatic deposit was found in the remaining kidney. It was none the less established that nephrectomy was performed with success, and that it determined the elevation of the Δ of the blood.

Disturbances of the circulation dependent upon simple painful phenomena may cause lowering of the Δ of the blood.

Koranyi records two examples of this where the Δ of the blood during the attack of renal colic was $-0{\cdot}76^{\circ}$ and $-0{\cdot}69^{\circ}$, and after the attack $0{\cdot}57^{\circ}$ and $-0{\cdot}58^{\circ}$ respectively.

Other conditions, such as anæmia, may lower the Δ of the blood without any renal lesion being present.

L. Bernard records the case of a chlorotic young woman, in whom the △ of the blood was − 0·01, while the other methods of investigation showed a normal renal permeability. One must remember the state of anæmia in which some of the patients are found, and the lowering of the freezing point that may be caused by this factor alone. Further, in these patients a diet rich in albuminoids may lower the point △ to a marked degree.

All these facts show the multiple sources of error which may lead to the belief of a bilateral renal insufficiency where one kidney alone is diseased, or, on the other hand, to the total absence of renal disease. Albarran states that he has performed grave surgical operations with success in the subjects of urinary disease where the △ of the blood was below − 0·60.

2. The normal △ of the blood − 0·56 does not indicate that the renal function is sufficient.

It is evident that, if from some cause, independent of the kidney, the freezing point of the blood is raised above normal, as one sees in hydræmias, a renal lesion causing insufficiency of these organs will have the effect of lowering the point △, and causing it to approach the normal. Three cases which amply prove this are recorded by Israel (anuria), Barnard (interstitial nephritis), and Wiebrecht (tubercuious disease of the kidney).

3. When one kidney is diseased, the △ of the blood may be − 0·60. Great molecular concentration of the blood has been observed in cases of unilateral pyonephrosis, unilateral cancer of the kidney, unilateral hydronephrosis, and even in renal colic.

4. When the two kidneys are diseased, the △ of the blood may be normal. A single kidney is sufficient to maintain the normal degree of concentration of the blood, and this work may, perhaps, be performed by the parts of the parenchyma of each kidney that are still spared. Each of these kidneys considered alone would be insufficient. Kummell and Rumpel have not observed such cases, but they have been recorded by Israel, Barnard, Wiebrecht, and Albarran.

Albarran believes that the study of the molecular concentration of the blood is only of practical interest in exceptional cases. When the △ of the blood is below − 0·58 or − 0·60,

it may raise a suspicion of a bilateral lesion, but in the greater number of cases, we can arrive at a precise diagnosis by other methods, and notably by analysis of the separated urines of the two kidneys.

When from any reason it is impossible to study separately the urines of the two kidneys, the investigation of the blood has a real interest.

Methylene Blue Test.—This method consists of injecting into the muscles of the buttock 15 minims of a 5 per cent. solution of methylene blue. The bladder of the patient is emptied at the time of the injection, and the urine is collected half an hour later and then an hour after the injection, then every hour following that, and then at longer intervals until the blue disappears from the urine.

The methylene is eliminated not only in the form of blue, but also in the state of colourless derivatives, called chromogens, capable of being transformed into blue by the addition of various reagents. The chromogen is demonstrated by the addition of a few drops of acetic acid to the fluid which is then boiled. The blue colour is thus restored.

The method was introduced by Achard and Castaigne, and gives a pretty accurate idea of the functional value of the kidneys. The following points are of importance in the test.

1. The commencement of the elimination. In the normal individual, the blue appears in the urine from half an hour to an hour after the injection. When the elimination is retarded, this delay is most frequently coincident with bilateral renal lesions. It is not, however, certain that a delay in the excretion of the methylene blue indicates with certainty the existence of a bilateral renal lesion.

Albarran states that he has seen a delay in two cases of simple movable kidney, and also in "prostatics," without renal lesion and unilateral renal tuberculosis. On the other hand, he notes that, in several cases of bilateral renal disease, the commencement of the elimination was normal.

2. The intensity of the colouration in relation to the total quantity of urine is an important part of the test. When the renal function is insufficient, the intensity of the colouration is invariably feeble. This rule has few exceptions when the total

quantity of urine is measured. It is not, however, absolute, and the renal function may be insufficient with an intense colouration. This anomaly is particularly noticed in parenchymatous nephritis, and there is less danger in meeting with it in surgical maladies of the kidney. On the other hand, one may observe a feeble elimination of blue without insufficiency of the renal function. Albarran has noticed an excessive proportion of chromogen excreted in this test in cases of pyelonephritis, and finds that this form preponderates, or is the only form eliminated in the graver forms of surgical nephritis.

3. The course of the elimination is interesting. According to Albarran and Bernard there is intermittent elimination where portions of both kidneys are in a state of compensatory hypertrophy. Sometimes the pauses in excretion may be shown in the mixed urines of the two kidneys, and they may also be evident when the urines of the two glands are studied separately, or when the secretion of a single kidney after nephrectomy is considered.

4. In a healthy subject, the duration of elimination is from 35 to 60 hours. The duration is sometimes prolonged in cases of urinary disease. But the excretion may be prolonged where the kidneys are healthy, and Albarran has noticed a duration of three or four days, or even longer, in cases of compensatory hypertrophy.

Bard has remarked an excessively rapid onset and short duration of the elimination, combined with an intense degree of colouration.

These were cases of parenchymatous nephritis, but the same phenomenon has also been observed in old-standing renal cases.

A rapid, short excretion of methylene blue, when the colouration is intense, appears to point to an exaggerated renal permeability, but, if the colouration is feeble, the permeability of the kidneys has apparently suffered.

The Phloridzin Test.—Von Mering discovered, in 1885, that the injection of phloridzin caused glycosuria, and that this glycosuria was due to the activity of the kidneys without any increase of sugar appearing in the blood. Klemperer applied the method to clinical medicine, and showed that this

renal glycosuria was defective in chronic nephritis. Achard and Delamare used the method as a test for the renal function, in 1899. A sub-cutaneous injection of 1 c.c. of a 1/200 solution of phloridzin is made after first ascertaining that the patient's urine is free from sugar.

Sugar usually appears in the urine in about half an hour, and the glycosuria lasts from two to four hours. The quantity of sugar eliminated is about 1 to 2 grammes, but errors in dosage must be reckoned with, and the results must not be judged with mathematical precision.

According to Achard and Delamare, the lowest limit of quantity should be between 50 centigrammes and 1 gramme, and the highest limit between 2 grammes and 2·50 grammes.

Certain drugs diminish the quantity of sugar, namely, salicylate of soda, jambul, antipyrin, and perhaps piperazine also.

The phloridzin is split into glucose and phloretin, but there is more sugar in the urine than is represented by the dose of phloridzin injected. Normally, if one injects 5 milligrammes, 1 to 3 grammes, or even more, are eliminated.

Von Mering demonstrated that, in dogs injected with phloridzin, the blood contained less sugar than in the normal state, and he claimed that the glycosuria was due to an excessive permeability of the kidney to sugar. But this is inadmissible, since the hyper-glycæmia is not in proportion to the quantity of sugar eliminated. The work of Levene, Minkowski, and Zuntz has proved that the phloridzin-glycosuria is undoubtedly renal in its origin.

The elimination commences from 15 to 30 minutes after the subcutaneous injection, but a delay is not of great importance. The excretion continues for 2 or 3 hours, and is prolonged in renal lesions as traces of sugar for 5 or 6 hours. The quantity of sugar eliminated is an important factor in the test.

In the usual glycosuria the quantity of sugar eliminated is from 1 to 2 grammes; the lowest limit is 50 centigrammes, and the highest 2·50 grammes. There may be a complete absence of sugar from the urine, or there may be an excessive quantity passed.

In discussing the test, Albarran holds that it is not of much practical value in estimating the total renal function. This

observer has found that the glycosuria was frequently slight, or even entirely wanting in cases in which the renal function was sufficient. On the other hand, where the other tests showed a diminished renal function, the phloridzin test showed a complete absence of sugar from the urine.

II.—WHAT IS THE FUNCTIONAL VALUE OF EACH OF THE TWO KIDNEYS?

Albarran points out the following fallacies which must be considered in estimating the functional value of each kidney:—

1. The two kidneys may both be diseased, but to different degrees, and in order to estimate the functional value of each, it must be compared with a normal kidney.

2. Lesions of one kidney may influence the function of the other kidney.

3. One kidney may appear more diseased than is really the case by comparison with its neighbour, whose function may be exaggerated.

4. Certain diseased kidneys may present an exaggerated function. The following are the important questions that arise:—

(1) What is the functional value of one of the two kidneys considered alone?

(2) How does the one kidney compare with the other?

(3) Up to what point is one of the kidneys capable of supplementing the other?

I.—WHAT IS THE FUNCTIONAL VALUE OF ONE OF THE KIDNEYS?

When one of the kidneys is sound, one may obtain a sufficiently precise idea of the function of the other by comparing the secretion of the two glands. Even here, however, one must remember the influence of the disease of one kidney upon the function of the other. When both kidneys are diseased, the comparison of their secretion does not suffice to inform us of the functional capacity of each organ. There are difficulties in the way of forming a standard urine from a single healthy kidney for comparison.

According to Albarran, the following may be taken as an average in a healthy subject, who has taken a light breakfast at 8 o'clock, and has not drunk since. The urine collected at eleven o'clock gives the following analysis.

Quantity	50—60 cc.
Δ	1·20—1·50.
Urea	12—17 grammes per litre.
NaCl	10—12 „ „ „

These figures are not absolute and apply only to subjects in whom both kidneys are healthy. When one kidney is diseased the healthy neighbour usually secretes more abundant and less concentrated urine. When, however, the quantity of urea exceeds fifteen or sixteen grammes per litre, the function may be considered satisfactory.

Methylene Blue Test.—When the elimination of methylene blue by one healthy kidney is studied, one finds that, as in considering the entire renal secretion, the elimination commences from one half to one hour after the subcutaneous injection, and acquires its maximum intensity about the third or fourth hour. In order to use all the points of the test, one should collect the urine of one kidney during several hours, but the two important points, the commencement of elimination and its intensity, may be estimated by collecting the urine during two hours. If this injection is given three quarters of an hour before the urine is collected and with a healthy kidney one should usually get the urine stained at the commencement of the collection. In the second hour of this collection, the third hour after the injection, the urine is deeply coloured.

The Phloridzin Test.—The elimination of sugar in this test varies greatly from one minute to another. The glucose usually appears from 20 to 30 minutes after the injection. There is more sugar in the second and fourth half hours following the injection than in the third. The proportion of sugar in the urine of the second half hour, varies from 0·6 to 1·50 per cent. Rarely is it raised to 1·8 or 2 per cent. The glycosuria of one kidney is too variable to allow of an exact normal figure to be stated, and, when the kidney is diseased, the differences in the glycosuria may be too great when dealing with similar lesions to allow of great value being placed upon the test.

There is no method among those described which permits us to say with certainty that the function of one kidney is perfectly normal, nor is there any method by which we can indicate with precision the extent of the lesion which determines the abnormal function. Albarran gives the following methods as sufficient to indicate with comparative accuracy the function of one kidney.

1. The urine is collected during at least two hours.

2. A note is made of the chemical composition of the urine, the point Δ and the quantity.

3. About an hour before the collection of the urines, a hypodermic injection is made of one cubic centimetre of a 5 per cent. solution of methylene blue.

4. One may replace the methylene blue by the injection of phloridzin at the time of commencement of the collection of the urine. The two tests may be made simultaneously, but here the estimation of sugar must be made by the polarimeter, as the methylene blue disturbs the estimation by Fehling's solution.

5. A comparison of the secretion of the kidney with that of the other side.

6. Microscopical examination of the urine.

If the results of these different methods are in accord, little doubt can remain in the majority of cases.

II.—TO DETERMINE THE COMPARATIVE FUNCTIONAL VALUE OF THE TWO KIDNEYS.

The following are Albarran's conclusions :—

1. When one studies the function of the kidneys during a quarter of an hour, one sees that the two kidneys produce a different quantity of urine, and that the concentration of each kidney in urea, chlorides and phosphoric acids is naturally in the inverse ratio to the quantity. The difference in the quantity of urine may be 50 per cent., in more than a few cases it exceeds 10 per cent.

2. The urea in a quarter of the cases shows a difference of concentration of 1 gramme per litre, and it may exceed 6·50 grammes.

3. In a third of cases, the difference between the

chlorides exceeded 50 centigrammes per litre, and might reach 5 grammes.

4. When one compares two successive examinations of each kidney collected during the same space of time, the differences are found to diminish.

5. In the same time, there is compensation between the two kidneys by the increased concentration of the less abundant urine.

6. In successive periods of time, the compensation is more complete, and is made up by the quantity and the concentration of the fluid, or by one of these factors alone.

7. The function of the kidneys is more equal when one compares it over a long space of time.

8. Any comparative examination of the two kidneys, in which the urine was collected during a less time than an hour, is not sufficient to estimate, even with considerable differences, the real comparative value of the two glands.

One may compare with advantage the urines of the two kidneys collected during the same time, and the following points may be studied:—

(*a.*) *The Quantity of the Urine.*—In a general way, the quantity of urine secreted during the same period of time is less on the side of the diseased kidney than on the side of the healthy kidney, but the diseased kidney is frequently found to secrete more than the healthy one. In certain cases, the two kidneys secrete the same quantity, although one is diseased.

The secretion of the healthy kidney, compared with that of the diseased organ, is usually considerable when the latter is extensively affected. Where the lesion is less extensive the relative secretion of the kidney is less striking and may be inverted, the diseased kidney secreting more actively.

The only disease, in which Albarran has not observed relative polyuria of the diseased kidney, is pyonephrosis. When the two kidneys secrete the same quantity of urine, that of the diseased side contains less urea and phosphates, and the Δ of the urine is more feeble. When the kidney, which secretes the most urine, has at the same time a greatly raised Δ and

a large proportion of urea and phosphates, this kidney should be considered the better of the two.

(*b.*) *The Molecular Concentration of the two Urines.*—Albarran gives the following conclusions drawn from his investigations:—

1. Almost constantly the Δ of the urine of the only diseased kidney, or of that most diseased, is lowest. Exceptionally the polyuria of the healthy kidney may determine a low Δ figure on that side.

2. The comparative Δ V (volume of urine) of the two kidneys gives figures more in proportion to the true molecular elimination of the two organs. Even in comparing the Δ V of the two kidneys, one may obtain higher figures on the diseased side.

3. The polyuria of the diseased kidney may modify its Δ and the Δ V. It is necessary to note this factor, and compare the two kidneys at the same time from the point of view of the quantity of urine and of the Δ.

4. When the kidney which secretes most urine shows at the same time a higher Δ, this kidney is the better of the two.

5. When there exists an important lesion in one of the kidneys, and its neighbour is healthy, or almost healthy, the difference between the two Δ is constantly considerable.

6. When the lesion is unilateral, but of slight importance, or when the lesions are bilateral and little different, the figures of the two Δ are equally small.

7. The relation of Δ or of Δ V of the two urines varies in the different hours of the day.

8. The Δ or the Δ V of the diseased kidney shows less variation than that of the sound kidney.

9. One cannot reckon the two Δ, or the two Δ V, in 24 hours from that taken during a quarter, or half an hour, or even two hours.

10. The comparative examination of the Δ is generally more exact the longer the time during which the comparison is made.

11. The comparison of the Δ of the two kidneys, and of the urea and phosphates, shows that their variations are usually but not invariably, on similar lines.

12. The differences in the urea and phosphoric acid of the two urines are usually greater than those of the two Δ V.

13. It is not unusual to observe a discrepancy between the Δ and the NaCl per litre, and also between the Δ V and the NaCl V. In these cases the difference of the two Δ is habitually greater than those of the two chlorides.

14. The total molecular diuresis of the diseased kidney, in comparison with that of the sound kidney, is generally superior to that of the urea, and inferior to that of the chlorides.

(*c.*) *The Quantity of Urea, Chlorides, and Phosphates contained in the Urines of the two Kidneys.*—In a general way, one may state that the proportion of these substances is greater in the urine of the healthy kidney than in that of the diseased kidney, and that the difference is usually proportionate to the extent of the lesion. This rule has exceptions as marked, when one considers the proportion of the materials dissolved per litre of urine, as when one studies the real quantity that each kidney furnishes during the same space of time.

Albarran has published a series of cases in which the proportion of urea, of phosphates and of chlorides was less on the side of the healthy kidney. According to these cases, one may say that in pyelo-nephritis, in renal tubercle, and in renal retention, one observes in 8 to 15, or even 30 per cent. of cases, that the proportion of urea per litre was greater on the side of the diseased kidney.

He has never seen this in pyonephrosis, nor in renal growths, without renal retention. In the great majority of these cases there was relative polyuria on the side of the healthy kidney with dilution of the urine. One must guard against the polyuric dilution of the urine in studying the absolute value of the quantity of the substances eliminated by each kidney in the same time. Under these conditions, the quantity of dissolved materials may be as great or greater on the side of the diseased kidney. In these cases, there exists almost constantly a polyuria of the diseased kidney, a polyuria which compensates, or even over-compensates, and thus its functional value does not appear to be diminished, when compared with that of the other kidney during a short space of time.

The Comparative Elimination of Methylene Blue by the Two

Kidneys.—With some exceptions, methylene blue is less freely eliminated by the kidney the more the organ is diseased. In this respect the delay in elimination is of slight value, and the important factors are the quantity eliminated, and the course of the elimination.

The course of the elimination, which does not give precise information when estimating the total renal function, is valuable when the two urines are studied separately. Albarran has observed a constant peculiarity. On the diseased side, the course of the elimination is uniform and continuous without alternating oscillations. On the healthy side, on the contrary, the elimination goes on pretty frequently by spurts and almost always presents marked oscillations. Practically the course of the elimination of blue can only be observed profitably if the examination is prolonged during several successive hours, or, better, during 24 hours, or several days.

The Phloridzin Glycosuria in the Urine of the two Kidneys.—Albarran recommends the injection of 2 centigrammes, a larger dose than is usually employed.

The injection may be made from a quarter to half an hour before the examination, or at the time of the examination. When the examination is only to extend over a short time, such as a quarter of an hour, the injection should be made half an hour or three-quarters of an hour, before the collection of the urine. The patient should not have taken any fluid for at least two hours before the examination.

For the diagnosis of a lesion of one kidney, a difference is required of more than 20 per cent. of sugar per litre, or of sugar measured in centigrammes, taking note of the quantity of the urine of each kidney, 15 per cent.

In a general way, it may be said that when one kidney is healthy and the other diseased, or when one kidney is more diseased than the other, the better kidney gives the greater quantity of sugar in absolute value as well as in proportion per litre. There are exceptions to this rule. The proportion of sugar may be modified by polyuria and a less quantity of sugar may be supplied by the healthy side, if the quantity of urine furnished by this side is greatly in excess of that from the other.

This is extremely rare when the patient has not drunk

before or during the test. When the diseased kidney is polyuric in comparison with its neighbour, it may eliminate in the same space of time as many centigrammes of sugar as, or even more than, the healthy kidney. The anomalies in the elimination of sugar are observed as frequently, when one compares the urea, or the Δ of the two urines, more often still in comparing the output of chlorides of each kidney.

From the point of view of the determination of the diseased kidney, therefore, the phloridzin test gives as good indication as the other methods of examination. It may even happen that in phloridzin-glycosuria, which exaggerates the differences between the two kidneys, one obtains an important indication in doubtful cases. Phloridzin-glycosuria does not allow us to judge of the integrity of one of the kidneys. Experimental glycosuria is inferior to the other methods for comparing the functional value of the two kidneys.

Albarran's Experimental Polyuria Test.—Albarran has established two general rules.

1. The diseased kidney has a much more uniform function than the healthy kidney, and its function varies less from one moment to another the more its parenchyma is destroyed.

2. When one kidney alone is diseased, or is the more diseased of the two, if the urinary function becomes disturbed, it modifies its function less than the other; the difference between the two glands is especially exaggerated by the variations in the function of the healthy kidney.

The comparative work of the two kidneys varies from one moment to another. In comparing the two urines during a short space of time, one may regard as the better kidney that which in reality is the worse. The error may occur as well in studying the Δ of the urines as their chemical composition, or the elimination of sugar, or of colouring matter. It is still more difficult to establish by these different methods a comparison between the functional values of the two kidneys.

If, instead of examining comparatively the total quantity of urine secreted by each kidney during a certain space of time, we compare a series of fractions of the same time, we can study the functional course of the kidneys. Thus, if, instead of collecting the right and left urines during three

hours and comparing the total quantities of urine excreted during that time, the three hours are divided into six periods of half an hour, and the six samples of each side are examined and compared, a curve for the diseased kidney and another for the healthy kidney may be constructed.

Important information may be gained since we know that the oscillations of the curves of each kidney will be the less marked the more the kidney is diseased. The differences between the two kidneys may be accentuated in making them perform during the examination a supplementary labour, such as the elimination of water, or of phloridzin glucose.

At the commencement of the examination, two centigrammes of phloridzin are injected subcutaneously. The urines of each kidney are collected during four or five consecutive half-hours. At the end of the first half-hour, the patient drinks three glasses of Evian water.

The following analyses of each half-hour urine from each kidney is made :—

1. The quantity of urine.
2. The Δ and the Δ V.
3. The urea per litre and in centigrammes.
4. The sugar per litre and in centigrammes.

One may in addition estimate the chlorides, and make a histo-bacteriologic examination. In the normal state, the curves of the two urines follow each other and present similar variations. In the pathological condition, the differences in the work of each gland are easily read in the curves.

In a simple case, it is only necessary to consider one curve, in the case of a renal lesion of slight extent, or in a double lesion, it is necessary to study all the curves.

A sound kidney should react to the polyuria caused by drinking the Evian water. The curve of the quantity of urine should be elevated at the same time that the Δ is lowered, and the urea and chlorides per litre are diminished. These oscillations should be evident, and affect several divisions. The curves of the true excretory substances Δ V, urea in centigrammes, and chlorides in centigrammes, can only yield modifications of slight importance, rising or falling during the polyuria without permitting one to draw conclusions when

they are considered alone, without comparing them with those of the other kidney.

One may consider satisfactory the elimination by one kidney in an adult man of from 1·20 grammes to 1·80 grammes of urea during the two hours of the duration of the test. The elimination of 75 centigrammes to 1 gramme may be considered as a mediocre performance, and below these figures should be regarded as a faulty excretion.

In feeble women, the normal is often from 90 centigrammes to 1 gramme.

The △ V presents as great variations as the quantity of urea.

In a man one may look upon 12,000 to 17,000 as good figures, 8,000 to 10,000 as mediocre, and 6,000 and lower as bad.

HISTORY OF A DIPHTHERIA OUTBREAK (COMPLICATED WITH VINCENT'S ANGINA) AT THE LAMBETH PAROCHIAL SCHOOLS, WEST NORWOOD, MAY TO JULY, 1905.

SPECIAL REPORT by JOSEPH PRIESTLEY, B.A., M.D., D.P.H.,
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INTRODUCTORY REMARKS.

An outbreak of diphtheria occurred during May, June, and July, 1905, amongst the children of the Lambeth Parochial Schools, which is situated in Elder Road, West Norwood, and which is under the control of the Lambeth Guardians. The majority of the cases were of a mild (chiefly nasal) type, which gave rise to difficulties, not only in diagnosis, but also in the adoption of the usual preventive measures. The slightness, and, in some cases, the apparent absence, of the well-known clinical symptoms of diphtheria, rendered it necessary to carry out minute and careful bacteriological examinations, both of "suspects" (*i.e.*, persons presenting doubtful diphtheria symptoms), and of "contacts" (*i.e.*, persons who had been in contact with diphtheria), involving a large amount of time and trouble. These bacteriological examinations were all carried out in the Lambeth Borough Laboratory, the great value of which has been again proved, and the results were afterwards, in every instance, confirmed by one or two, or even, at times, three independent well-known bacteriologists. These confirmatory examinations were thought to be advisable in view of the fact that a number of children were, by order of the Medical Officer of the Schools, sent away to the Metropolitan Asylums Board Hospitals for isolation, although such children appeared to be at the time clinically in good health, despite the proved presence in the throats, or noses, or both, of the true Klebs-Lœffler diphtheria bacilli. These *potential* or *carrier* diphtheria cases caused much anxiety, as the children, though not apparently suffering from diphtheria in the ordinary clinical sense, were none the less capable of transferring the disease to others, who might be more susceptible to diphtheria infection, and might, consequently, suffer severely clinically. Their strict isolation,

away from the Schools, was deemed to be absolutely necessary ; indeed, had it not been for such strict isolation of all "carrier" as well as other cases, the outbreak could not have been stamped out so effectively, and so quickly, as it was.

It is acknowledged by all experts that diphtheria, like other infectious diseases, occurs clinically in varying degrees of severity, from the very slightest departure, if any, from normal health, with no characteristic local lesion, to the well-known typical manifestations and symptoms of the disease in its acute severest form, with, or without, characteristic local lesion. There is no correspondence between (*a*) severity of clinical symptoms and virulence of infection, or between (*b*) virulence of infection and special morphological types of diphtheria bacilli. Whilst occasionally, very rarely, the true virulent Klebs-Lœffler diphtheria bacilli may be found in the throat, or nose, of a person in normal health, and who has not been in known contact with diphtheria, it is generally agreed that their presence in the throats and noses of children, who are always, more or less, susceptible, when aggregated together, more especially with diphtheria about, calls for trict attention, *e.g.*, in the way of isolation, disinfection, and other preventive measures. Indeed, the infectivity of what are known as "latent" (*i.e.*, symptomless) forms of diphtheria is one of the most troublesome things to deal with, and the safest line of action is to strictly isolate, etc., not only all patients, who show in their throats, or noses, or both, "true" or "real" diphtheria bacilli ; but also all "contact" or "suspect" patients, especially children, who show in their throats, or noses, or both, "doubtful" or suspicious diphtheria bacilli, during the prevalence of a genuine diphtheria outbreak or epidemic. These latter patients may prove to be sources of infection as well as the former. All "latent" forms of disease are important, and have proved especially so in connection with the outbreak of diphtheria and pseudo-diphtheria at the West Norwood Schools. Clinical diphtheria, as it is sometimes seen, *e.g.*, high temperature, swollen throat, discharging nose, the presence of membrane, etc., can be readily diagnosed by a mere tyro in medicine, but "latent" diphtheria, *e.g.*, with few, if any, clinical symptoms, but with simply the diphtheria bacilli in the throat, or nose, or both, can

only be diagnosed by bacteriological examination. Between these two types there are many intermediate gradations.

The clinical symptoms, found in the 64 diphtheria patients from the Norwood Schools, varied from the usual severe ones to a slight redness, or catarrh of the nose, or fauces, or both; whilst, in some few cases, there was, apparently, an entire absence of any such clinical symptoms. The true Klebs-Lœffler diphtheria bacilli were found in the throat, or nose, or both, on bacteriological examination, of all the 64 notified diphtheria patients, either before, or after their removals to hospital. The patients may be classified as follows:—

1. Those with clinical diphtheria, more or less severe, with Klebs-Lœffler diphtheria bacilli in their throat, or nose, or both;

2. Those with nasal catarrh and faucial redness, or sub-acute tonsillitis, with Klebs-Lœffler diphtheria bacilli in their throats, or noses, or both;

3. Those with no clinical symptoms whatever, but showing the presence, on examination, of Klebs-Lœffler diphtheria bacilli in their throats, or noses, or both.

The diphtheria bacillus is undoubtedly polymorphic and variable in virulence according to environment, *e.g.*, state of mucosa.

TYPES OF GERMS FOUND DURING OUTBREAK.

The different diphtheria bacilli found in connection with the outbreak may be classified as follows:—

1. True Klebs-Lœffler, delicate, slender, even rods, of varying lengths of from 3 to 5 μ, long, short, and medium, and of 1 μ in thickness; non-motile, non-sporing, staining with methylene blue (Lœffler), segmentally and polarly, and, with Gramm's and Neisser's methods, characteristically; with a tendency to arrange themselves in parallel groupings; acid reaction with glucose; virulent to animals, *i.e.*, lethal to guinea-pigs with loss of weight; affected by antitoxin.

2. Involuted or modified forms of Klebs-Lœffler, spindle-shaped and club-shaped rods, staining irregularly, *i.e.*, not distinctly segmentally and polarly, with methylene blue (Lœffler), and only occasionally with Gramm's and Neisser's methods; slight acid reaction with glucose; non-virulent to animals, *i.e.*, not lethal to guinea-pigs, but simply causing them local swelling without loss of weight; unaffected by antitoxin.

3. Hoffmann, or pseudo-diphtheria, short, even, rods, staining evenly with methylene blue (Loeffler), and not at all characteristically with Gramm's or Neisser's methods; no acid reaction with glucose; non-virulent to animals, *i.e.*, not lethal to guinea-pigs, but simply causing in them local swelling without loss of weight; unaffected by antitoxin.

These three different classes were found (*a*) in pure cultivation, or (*b*) mixed, in varying proportions, one with the other. The groupings of the Hoffmann pseudo-diphtheria bacilli, at times, in some of the cases, seemed to point to a sort of connection or co-relation of such bacilli with the true Klebs-Loeffler diphtheria bacilli, antecedently or subsequently.

The outbreak at the Norwood Schools is interesting, bacteriologically, from another point of view, viz., the presence in the throats and noses of some of the patients of a mixed infection, viz., (*a*) Vincent's organisms, in addition to (*b*) Hoffmann's pseudo-diphtheria bacilli, and (*c*) Klebs-Loeffler diphtheria bacilli. By means of the presence in some of the cases of these Vincent's organisms, the source of the outbreak was definitely traced, such organisms being due to a concurrent outbreak of Vincent's angina, or ulcerative stomatitis, in both of which diseases they are stated to occur (*vide infra*).

Vincent's organisms are (1) fusiform, elongated bacilli, varying in length from 6 to 12 inches and from 1 to 1·5 inches in breadth, vacuolated, motile or non-motile, not staining with Gramm's fluid, but staining irregularly with Ziehl's liquid; and (2) fine, long spirilla of varying lengths, sinuous and very motile, staining badly, or not at all, with the usual staining fluids. The fusiform bacilli are readily cultivated in ordinary broth, or in human serum, but the spirilla not at all.

The Vincent's organisms (only the fusiform) found were due to a concurrent attack, or outbreak, of either ulcerative stomatitis, or the ulcerative form of Vincent's angina, which occurred at, or about, the time of the diphtheria outbreak. They are found in both these diseases, of which the former is well known, and the latter has been fully described by Professor H. Vincent in the *Lancet* of May 13th, 1905. From this description, it appears that Vincent's angina (angine de Vincent) is a disease allied to diphtheria and to other forms of throat troubles, and is, at times, contagious, spreading from person

to person, either by direct contact, *e.g.*, kissing, or indirectly, through the use of towels, drinking utensils, spoons, forks, knives, etc. The disease exists in two forms, *e.g.*, (*a*) diphtheroid, like diphtheria, or (*b*) ulcero-membranous, deep ulcerations of the membranes over the tonsils, palate, etc., and, though it may appear at any age, it is specially frequent amongst children from 8 to 10 years, and amongst young adults from 18 to 30 years of age.

DETAILS OF THE OUTBREAK.

The details of the diphtheria outbreak at the Lambeth Parochial Schools are unique in showing how diphtheria may be definitely traced from child to child, so that the cases fit one into another like a Chinese puzzle (*vide* tables). The first two cases notified, Emily Grantham and Dorothy Wilson, were removed to the Metropolitan Asylums Board Hospitals on May 16th, followed by five more cases on May 17th, one on May 18th, two on May 29th, 47 during June, and six during July. The last patient, Charles Thompson, was removed to hospital on July 14th, and since then, up to the date of this report, no other case of diphtheria has been notified, or removed to hospital, in connection with the Schools, the inmates of which consist of about 600 children, ranging in ages from 3 to 16 years, and officers.

Hospital isolation, at the Metropolitan Asylums Board's Hospitals, was insisted upon in the case of all patients, whose throats or noses showed, on bacteriological examinations, the Klebs-Lœffler diphtheria bacilli; and that, too, irrespective of whether or not clinical symptoms were also present; whilst equally strict isolation, at the infirmary attached to the Schools, was insisted upon in the case of all patients, whose throats or noses showed, on bacteriological examinations, only the so-called pseudo-diphtheria (Hoffmann) bacilli. In no single instance, whether at the Metropolitan Asylums Board's Hospitals, or at the Schools' infirmary, was a patient allowed to pass from isolation back to the main building of the Schools, and to mix with the other inmates therein, until negative results had been obtained from three successive bacteriological examinations of the throat and nose.

Of the 63 cases removed to the Metropolitan Asylums

Board's Hospitals, 62 were children varying in age from 3 to 14 years, and 1 was an assistant nurse, Miss Bell, aged 21 years. A lady clerk, Miss Orbell, aged 28 years, was also notified on June 29, and was isolated in a private house away from the Schools, making a total of 64 cases in which Klebs-Lœffler diphtheria bacilli, or Vincent's organisms, were found, comprising the outbreak. Miss Orbell, the lady clerk, was engaged at work daily in the infirmary of the Schools.

The ages of the 62 children infected were as follows :—

Age	Number.	Age.	Number.
3 years	3	9 years	3
4 ,,	10	10 ,,	6
5 ,,	5	11 ,,	4
6 ,,	18	12 ,,	
7 ,,	4	13 ,,	3
8 ,,	5	14 ,,	1
		Total	62

No death occurred.

The results of the bacteriological examinations of the 64 notified diphtheria cases were as follows :—

Klebs-Lœffler diphtheria bacilli found	59
Vincent's organisms and (?) modified Klebs-Lœffler diphtheria bacilli found	2
Klebs-Lœffler diphtheria bacilli and Vincent's organisms found	3
Total	64

Of the 64 notified patients, 52 showed also clinical symptoms, more or less severe, of diphtheria, and in no single instance was a patient returned from the Metropolitan Asylums Board's Hospitals certified as "*not* suffering from diphtheria."

Apart from the bacteriological examinations carried out in connection with the 64 notified diphtheria cases, a very large number of other examinations took place, by which all pseudo-diphtheria cases also were "weeded out" and isolated. The total number of bacteriological examinations made at

the Borough Laboratory, in connection with the outbreak, was 1,332, of which full details are given in Table VI. at the end of the Report.

The first 2 cases notified, Emily Grantham and Dorothy Wilson, showed in their throats, on bacteriological examination, Klebs-Lœffler diphtheria bacilli, that from Dorothy Wilson showing, with smear preparations, Vincent's organisms also. Of the 5 cases notified the next day (May 16), 2 showed Klebs-Lœffler diphtheria bacilli alone, and 3 Vincent's organisms together with modified Klebs-Lœffler diphtheria bacilli. The next case notified, Walter Button, showed, on bacteriological examination, definite Vincent's organisms together with indefinite, modified or involuted, Klebs-Lœffler diphtheria bacilli. The remaining 56 cases notified showed only the presence of Klebs-Lœffler diphtheria bacilli in their throats, or noses, or both.

The dates of removal of the patients to the Metropolitan Asylums Board's Hospitals, together with the patients' ages, are as follows:—

Date.	Number removed to M.A.B. Hospitals.	Ages.
May 16	2	4, 6.
,, 17	5	4, 5, 6, 6, 6.
,, 18	1	11.
,, 29	2	3, 13.
June 6	3	6, 6, 7.
,, 9	2	5, 6.
,, 13	3	4, 10, 11.
,, 15	2	6, 8.
,, 16	7	4, 5, 6, 6, 6, 7, 11.
,, 17	8	4, 4, 6, 6, 6, 7, 8, 13.
,, 19	2	4, 10.
,, 20	1	4.
,, 21	5	3, 4, 6, 8, 10.
,, 22	5	6, 8, 8, 9, 9.
,, 23	1	10.
,, 24	2	5, 21.
,, 28	1	14.
,, 30	5	5, 6, 9, 10, 11.

Date.	Number removed to M.A.B. Hospitals.	Ages.
July 1 - - -	1	3.
,, 3 - - - -	1	10.
,, 4 - - -	1	4.
,, 10 - - - -	2	7, 13.
,, 14 - - -	1	6.
May to July - -	63	3 to 21 years.

Miss Orbell (aged 28), a lady clerk, was notified on June 29, and removed to isolation at a private house away from the Schools the same day.

ORIGIN OF THE OUTBREAK.

The Schools at West Norwood consist of (1) main building, and (2) other buildings. The main building comprises the administrative block, central, together with eight main blocks, as wings, known as A. North, A. South, B. North, B. South, C. North, C. South, D. North, D. South.

The other buildings comprise:—(*a*) Receiving Ward; (*b*) Probation Ward; (*c*) Infirmary Ward; and (*d*) Isolation Ward (small); and are all separate and away from the main building and from one another, so as to prevent, with ordinary administrative care, any intercommunication amongst the respective inmates of the different buildings. The receiving and probation wards are of interest, as forming a sort of sieve, or filter, between the outside world and the main building of the Schools, a most desirable and praiseworthy provision, having regard to the fact that the inmates of the Schools consist chiefly of children. Like in many other praiseworthy provisions, the slightest irregularity or carelessness may prove fatal. The outbreak was eventually traced to two chief sources:—A.—Infirmary of the Schools, and B.—Receiving Ward of the Schools.

A.—Infirmary as the First Source of the Outbreak

C. South Block was chiefly infected, 6 of the first 10 cases notified being connected therewith, to be followed by 25 more

cases, 24 children and 1 attendant, also connected therewith. A census was taken of the inmates of the C. South Block, and is set out in Tables II. and III., according to dormitories occupied by such inmates. The inmates consisted of 66 children, and 30 of these, 17 from the lower, and 13 from the upper dormitory, were eventually removed to the Metropolitan Asylums Board's Hospitals, *potentially*, or *actually*, suffering from diphtheria, complicated in 5 instances with Vincent's angina or ulcerative stomatitis as shown by the fact that Klebs-Lœffler diphtheria bacilli and Vincent's organisms were found in their noses, or throats, or both, on bacteriological examination. Of the 66 original inmates (children), 9 others showed, on examination, Hoffmann pseudo-diphtheria bacilli in their throats, or noses, whilst 1 child, Joseph J. Tipper, aged 4 years, occupying a bed in the lower dormitory, showed in his throat modified, "involuted," Klebs-Lœffler diphtheria and Hoffmann pseudo-diphtheria bacilli, together with a few doubtful Vincent's organisms, pointing to a recent attack, three or four weeks ago, of diphtheria complicated with Vincent's angina or ulcerative stomatitis.

HOW THE DISEASE SPREAD INTO THE MAIN BUILDING.

Joseph J. Tipper was an important clue, and his past history was carefully investigated, with the following results :— Joseph J. Tipper had never been *outside* the School buildings in attendance at school, and had not been visited since February 6, 1905. From April 13 to April 28, 1905, he had been at the Infirmary, belonging to the Schools, suffering from certified stomatitis and catarrh, having been moved thither from C. South Block, whither he was allowed to return, when convalescent, on April 28, *direct* from the Infirmary. At the Infirmary, he occupied a bed in the Lower (Boys') Ward, and in the next bed to him, from April 22 to 25, was Willie Jarvis, aged 4 years, whose throat showed, on examination, modified, "involuted," Klebs-Lœffler diphtheria bacilli, and also a few doubtful Vincent's organisms, indistinguishable from those found in the throat of Joseph J. Tipper.

The rest of the Jarvis family were traced, three being found at the Schools and three at the Workhouse, situated three or four miles away from the Schools.

Bacteriological examination showed as follows:—

1. *At the Schools.*

Name.	Age.	Result.
Harry Jarvis	8 years	Modified (involuted) Klebs-Lœffler diphtheria bacilli, and Vincent's organisms.
Alice Jarvis	6 „	? Modified (involuted) Klebs-Lœffler diphtheria bacilli.
Rose Jarvis	12 „	? Modified (involuted) Klebs-Lœffler diphtheria bacilli.

2. *At the Workhouse.*

James Jarvis	32 years	Negative.
Mary Jarvis	38 „	Modified (involuted) Klebs-Lœffler diphtheria bacilli.
Sarah Jarvis	4 months	Klebs-Lœffler diphtheria bacilli (pure cultivation).

The mother (Mary) infected her five children, of whom four went to the West Norwood Schools, where Willie, at the infirmary, as already stated, infected Joseph J. Tipper, who, in his turn, carried infection from the infirmary into C. South Block of the main building, thereby infecting, directly or indirectly, 31 inmates, 30 children and 1 adult. The remaining child (Sarah) stayed at the Workhouse with her mother, and contracted the disease (diphtheria) from her, as did also 10 other inmates at the Workhouse, a small localised outbreak, which did not spread rapidly because the majority of the inmates were adults. Mrs. Jarvis last saw her four children, before they went into the West Norwood Schools, on April 25, 1905.

Other cases of "sore throats," non-diphtheritic, occurred at the Workhouse Infirmary between July 13th and 19th, a total of 34. Whilst Willie Jarvis probably *directly* infected Joseph J. Tipper, occupying the next bed at the infirmary, he also, together with his brother and sister, Harry and Alice, infected other patients, who were at the time being treated at the Schools infirmary for other diseases, *e.g.*, Walter Button, admitted May 5, of conjunctivitis, into Lower (Boys') Ward; Alice Trebett, admitted May 7 for seborrhœa, into Upper (Girls') Ward; Kate Hemmings, admitted February 3, for

tonsillitis and stomatitis, into Lower (Girls') Ward; Jane Sutton, admitted May 13 for conjunctivitis, into Lower (Girls') Ward. Willie Jarvis was in the Lower (Boys') Ward, Alice Jarvis in the Upper (Girls') Ward, and Harry Jarvis in Upper (Boys') Ward, whilst intercommunication between the Jarvis children and other inmates of the Schools Infirmary would take place also in the corridors, and in the rooms used in common, the dining and recreation rooms, lavatories, etc. The direct spread of infection is readily understood. Miss Orbell, a clerk residing daily at the Schools Infirmary, also probably contracted her infection from this source.

WHY THE DISEASE SPREAD INTO THE MAIN BUILDING.

Joseph J. Tipper contracted his disease from Willie Jarvis at the Schools Infirmary, both having it in a mild clinically unrecognisable form, and being allowed to pass *directly* from the Schools Infirmary into C. South Block without first passing through a convalescent, or probation ward. In this way, direct intercommunication as between the Schools Infirmary and the Main Building was allowed, although the medical officer of the Schools had, in a Special Report, dated March 14th, 1905, pointed out the danger of such a course, and warned the Guardians, a warning which was not taken. The Schools Infirmary is, in this way, shown to have been directly responsible for a total of 36 notified cases of diphtheria, of which 35 were removed to the Metropolitan Asylums Board's Hospitals, and 1 was isolated at a private house in West Norwood.

It may be noted, in passing, that the Schools Infirmary had, in exactly the same way, proved a source of danger to the main buildings of the Schools during an outbreak of measles, 1902–3.

(B.)—Receiving Ward as the Second Source of the Outbreak.

On June 10th, 1905, a child, Bridget Archer, aged 4 years, was admitted to the Receiving Ward, which, at the time, was supposed to be in quarantine, from the Lambeth Workhouse, three or four miles away. The child had what was stated to be simply enlarged and inflamed tonsils, and, being provided with a medical certificate to that effect, it was presumable that the case was not diphtheria. A bacteriological examination

was, however, made, and a pure cultivation of Klebs-Lœffler diphtheria bacilli obtained from the swab. The child was, consequently, removed to the Metropolitan Asylums Board's Hospitals, next day, June 17, but had been in the Receiving Ward for 24 hours in contact with 40 other children, who were in the same ward, and whose throats were infected at the same time with pure or modified pseudo-diphtheria (Hoffmann) bacilli, and modified Klebs-Lœffler diphtheria bacilli. The result was an explosive outburst, during the following four to fourteen days, of pure diphtheria, 9 children directly, to be followed by 7 others indirectly. Bridget Archer was the match that caused the explosion. The Receiving Ward was at once, June 19, closed against all new entries. It was afterwards found that Bridget Archer, before leaving the Workhouse had caused, directly or indirectly, a localised outbreak of diphtheria there, 11 cases in all.

The Receiving Ward is, in this way, shown to have been directly responsible for a total of 17 notified cases of diphtheria, all of which were removed to the Metropolitan Asylums Board's Hospitals.

(C.)—Other Secondary (Minor) Sources of the Outbreak.

The total number of notified dipththeria cases comprising the outbreak is 64, and, of these, 53 have already been traced directly (*a*) to the Schools Infirmary (36), and (*b*) to the Receiving Ward (17), leaving 11 cases unaccounted for. Of these 11 cases, 1 came directly from the Workhouse, and 8 were probably connected with the C. South Block outbreak indirectly, contracting their infections therefrom during the time that the inmates of C. South Block were quarantined in the block itself, which forms part of the main buildings, the block itself being only cleared of inmates, by special order, on June 19. These 8 cases were distributed in the main buildings as follows :—A. North, 1 ; A. South, 1 ; B. South, 2 ; B. North. 1 ; C. North, 1 ; D. North, 2. The 2 remaining cases came from the Probation Ward, but the source, or sources, of their infections conld not be definitely traced.

BACTERIOLOGICAL EXAMINATIONS.

The diphtheria outbreak is noteworthy for the very large number of bacteriological examinations (1,332) carried out,

and their proved value, in connection with the investigation. Without these bacteriological examinations, the source of the outbreak would not have been so successfully traced, and its further spread so effectually prevented. The amount of work involved in this connection was considerable, the whole of the bacteriological examinations having been made in the Lambeth Borough Laboratory, and practically confirmed in each case by outside independent bacteriologists, *vide* Table VI. giving particulars of the bacteriological examinations, from which it will be seen that many different germs were isolated from many swabs taken from the noses and throats of the children.

PREVENTIVE MEASURES ADOPTED.

The usual well-known preventive measures were taken, viz.:—notification, isolation, and disinfection, together with a careful medical inspection of all contacts and suspects, including bacteriological examinations of their noses and throats. The value of the strict isolation of all persons showing the presence of either Klebs-Loeffler (diphtheria) or Hoffmann (pseudo-diphtheria) bacilli, whether in pure cultivation or modified, was shown. No patient was deemed free from infection until after three successive negative bacteriological examinations of both noses and throats. Antitoxin injections were also found to be of use, therapeutically and prophylactically.

C. South Block was placed in quarantine at first, but it was found necessary to empty this block entirely, and to transfer all the remaining children to the Isolation Block, a course which was advised from the first, but the advice was not taken until June 19. Had the advice been taken before, the disease would, in all probability, not have spread from C. South to the other blocks, viz.:—A. North and South, B. North and South, C. North, and D. North, eight cases in all. Two cases occurred in the Probation Ward. The Infirmary and Receiving Wards were also put in quarantine, but in this latter case, this quarantine was not strictly kept, *e.g.*, Bridget Archer.

All visiting was stopped, and all passes out for the children were countermanded, whilst even the use of the swimming bath and fountains, in the school grounds, was prevented, the cups of the fountains being taken away. All drains

were examined, and found to be in good order and condition. The milk supply to the Schools was carefully examined and found to be satisfactory. Disinfection was carried out by the Borough Council officials. Finally, it may be mentioned that for from two to three months previous to the outbreak, the guardians' medical officer, Miss Johnson, had removed enlarged tonsils from many of the children, a salutary provision that doubtless prevented the disease from spreading in a malignant, or severe form.

CONCLUSIONS.

Attention may be drawn to the following points :—

1. The mildness and nature (nasal) of the type of diphtheria (latent forms), and the value of bacteriological examinations in connection therewith.

2. The importance of convalescents from infirmaries, wherein infectious disease may be, or have been, present, passing through a probation, or convalescent period, in special wards, before returning to their homes and mixing with other persons, especially children, *i.e.*, being treated like "contacts."

3. The power that the Klebs-Lœffler diphtheria bacillus appears to have of losing its virulence, lying dormant and afterwards regaining it in suitable environment, *e.g.*, state of mucosa, etc.

4. The fact that the diphtheria organisms vary greatly from the point of view of virulence and morphology, *e.g.*, granular, barred, or even-staining ; long, short, and medium sizes ; modified, "involuted," forms, etc.

5. The need for strictly isolating all "carrier" or potential cases, *i.e.*, persons, especially children, who do not show any clinical symptoms, but who have in their throats, or noses, or both, diphtheria germs.

No account of the outbreak would be complete without reference to the help given by the medical officer of the Schools (Dr. Alice Johnson), such help being ungrudgingly and unstintingly afforded. To Dr. Johnson and the nursing staff at the School infirmary belongs the praise of giving practical effect to the suggestions made by the Medical Officer of Health.

TABLE I.

Showing particulars of all Diphtheria cases notified and removed to Metropolitan Asylums Board's Hospitals from the Norwood Parochial Schools.

NORWOOD PAROCHIAL SCHOOLS.

Name.	Age.	Block or Ward.	Date of Removal to Hospital.	Result of Bacteriological Examination. Nature of Bacilli found.	Date of Return from Hospital.	Length of stay (days) in Hospital.
*Emily Grantham	6	C.S.	May 16	Klebs-Loeffler	June 22 / Aug. 16	85
Dorothy Wilson	4	,,	,, 16	Klebs-Loeffler / Vincent's Organisms	Aug. 22	98
David West	6	,,	,, 17	Klebs-Loeffler	,, 11	86
Florence Cooper	5	,,	,, 17	,, ,,	July 19	63
Florence Cumins	6	C.S. (U.D.)	,, 17	,, ,, / Vincent's Organisms	,, 13	57
Philip Jones	6	R.W.	,, 17	Vincent's Organisms	May 29	12
Kate Hemmings	4	Infirmary	,, 17	,, ,,	July 22	66
Walter Button	11	,,	,, 18	,, ,, / Klebs-Loeffler	Aug. 14	88
Jane Sutton	13	,,	,, 29	Klebs-Loeffler	July 13	45
Francis Clarke	3	C.S.	,, 29	,, ,,	,, 3	35
Alice Trebett	7	Infirmary	June 6	,, ,,	Aug. 11	67
Marie Burrell	6	C.S. (U.D.	,, 6	,, ,,	July 28	53
George Smith	6	C.S.	,, 6	,, ,,	Sept. 27	114
Lily Rachel	6	,,	,, 9	,, ,,	July 19	40
Walter Power	5	,,	,, 9	,, ,,	,, 24	45
†Florence Fuller	11	C.S. (U.D.)	,, 13	,, ,,	April 3	294
Sydney Eyre	4	C.S.	,, 13	,, ,,	Oct. 21	130
Maud Smith	10	C.S. (U.D.)	,, 13	,, ,,	Aug. 4	52
Lily Sedgwick	8	,,	,, 15	,, ,,	Oct. 21	128
Annie Kennedy	6	,,	,, 15	,, ,,	July 12	27
Charles Bartley	6	C.S.	,, 16	,, ,,	Sept. 6	82
Charles Norris	6	,,	,, 16	,, ,,	Oct. 26	132
Susan Fox	11	C S. (U.D.)	,, 16	,, ,,	July 24	38
Gertrude Baker	6	,,	,, 16	,, ,,	Aug. 4	49
Charles Fox	4	C.S.	,, 16	,, ,,	,, 7	52
Fred Cherry	5	,,	,, 16	,, ,,	,, 4	49
Lily Smith	7	C.S. (U.D.)	,, 16	,, ,,	,, 4	49
Lily Bouchier	7	,,	,, 17	,, ,,	,, 4	48
Arthur Cooper	4	C.S.	,, 17	,, ,,	July 12	25

* Emily Grantham, Clarence Rouse, and Thomas Chorley were returned from M.A.B. hospital with diphtheria bacilli in their throats and noses, and were consequently sent back on June 29, July 14, and July 14 respectively.

† Sent to Convalescent Home at Eastcliffe direct from M.A.B. hospital.

TABLE I.—*continued.*

Name.	Age	Block or Ward.	Date of Removal to Hospital.	Result of Bacteriological Examination. Nature of Bacilli found.	Date of Return from Hospital.	Length of stay (days) in Hospital.
Bridget Archer -	4	Lambeth Workhouse & R.W. C.S. (U.D.)	June 17	Klebs-Loeffler	Aug. 4	48
Violet Ramsdale -	6	,,	,, 17	,, ,,	July 28	41
Emily Beaumont -	12	,,	,, 17	,, ,,	Dec. 11	177
Daisy Barrett -	6	,,	,, 17	,, ,,	July 29	42
Ben Oakley -	8	Boys A.N.	,, 17	,, ,,	,, 28	41
Emma Foulger -	6	C.S.	,, 17	,, ,,	Aug. 4	49
Richard Burrell -	10	A.S.	,, 19	,, ,,	July 3	14
*Clarence Rouse -	4	B.S.	,, 19	,, ,,	July 12 / Aug. 5	45
*Thomas Chorley -	4	,,	,, 20	,, ,,	July 11 / Aug. 5	43
Doris Bissmore -	4	C.S.	,, 21	,, ,,	,, 15	55
Mildred Bounds -	3	R.W.	,, 21	,, ,,	July 28	37
William Randell -	10	B.N.	,, 21	,, ,,	Aug. 7	47
James Bounds -	8	R.W.	,, 21	,, ,,	Oct. 21	22
Daniel Mumford -	6	,,	,, 21	,, ,,	Aug. 7	47
Florence Nicholls	8	,,	,, 22	,, ,,	,, 11	50
George Eslin -	9	,,	,, 22	,, ,,	,, 11	50
Ellen Archer -	6	,,	,, 22	,, ,,	,, 7	46
Violet Franks -	8	D.N.	,, 22	,, ,,	,, 5	46
Alice Bounds -	9	R.W.	,, 22	,, ,,	,, 7	46
Christopher Eslin	10	,,	,, 23	,, ,,	July 24	31
Alfred Nicholls -	5	,,	,, 24	,, ,,	Aug. 7	44
Julia Bell (Attendant)	21	C.S.	,, 24	,, ,,	,, 7	44
Alfred Grubb -	14	R.W.	,, 28	,, ,,	July 29	31
Elizabeth Locke -	5	C.S.	,, 30	,, ,,	Aug. 14	45
Robert Beckett -	9	R.W.	,, 30	,, ,,	July 26	26
Sarah Greenwood	10	,,	,, 30	,, ,,	,, 28	28
Rosina Hick -	11	,,	,, 30	,, ,,	,, 26	26
Frederick Marshall	6	,,	,, 30	,, ,,	Aug. 11	42
Florence Marshall	3	,,	July 1	,, ,,	,, 4	34
Rose Maddocks -	10	D.N	,, 3	,, ,,	,, 14	42
John Mumford -	4	R.W.	,, 4	,, ,,	July 29	25
Julia Baldwin -	7	C.N.	,, 10	,, ,,	Aug. 15	36
Alice Noyes - -	13	P.	,, 10	,, ,,	July 29	19
Charles Thompson	6	,,	,, 14	,, ,,	Aug. 4	21

N.B.—Miss Orbell, aged 25 years, a clerk at the infirmary, was notified on July 29, and isolated at a private house in Norwood, away from the Institution.

* Emily Grantham, Clarence Rouse, and Thomas Chorley were returned from hospital with diphtheria bacilli in their throats and noses, and were consequently sent back on June 29, July 14 and July 14 respectively.

TABLE II. Diagram showing positions of beds as occupied with the names of the occupants in the Lower Dormitory of C South Block, when Joseph J. Tipper infected, directly or indirectly, 17 children, from April 28 to May 27, 1905.

C. SOUTH-BLOCK

WINDOW					WINDOW	
SYDNEY EYRE 9/6/ – 13/6/		GEORGE DRAGE		EMILY GRANTHAM 19/5/ – 13/5/	CHARLES HARTLEY 12/0/ – 16/5/	FLORENCE COOPER 12/5/ – 17/5/
ETHEL BIRCH	JOSEPH TIPPER	DORIS BISSMORE 18/6/ – 21/6/		EMMA FOULGER 12/6/ – 17/6	VIOLET NASH	ARTHUR STEVENSON
VICTOR MONCKTON	ELIZABETH LOCKE 27/6/ – 30/6/	MARY ANN KEEVIL		DAVID WEST 16/5/ – 17/5/	EDWARD FAVIOR	ARTHUR COOPER 14/6/ – 17/6/
FIRE PLACE	[LOWER DORMITORY RESTRICTED TO CHILDREN BETWEEN 3 & 6 YRS OF AGE]					DOOR
MOLLY VINCER		GEORGE SMITH 1/6/ – 6/6/	FRED CHERRY 13/6/ – 16/6/	CHARLES FOX 14/6/ – 16/6/	LILY RACHEL 8/6/ – 9/6/	CHARLES NORRIS 12/6/ – 16/6/
TEDDIE BIRD	DOLLY WILSON 14/5/ – 16/5/	STANLEY VALE	CHARLES NEWMAN	WALTER POWER 8/6/ – 9/6/	FRANCIS CLARKE 26/5/ – 29/5/	NELLIE Mc DONALD
		WILLIE SHEAN		WILL MARSHALL	ROSE BARWOOD	DAISY BATTS
	WINDOW				WINDOW	

N.B.—Names underlined = diphtheria cases. Dates = those of sickening, or showing bacilli and removal to hospital respectively.

TABLE III.—Diagram showing positions of beds as occupied (with the names of the occupants) in the Upper Dormitory of C South Block, when Joseph J. Tipper infected, directly or indirectly, 13 children, from April 28 to May 27, 1905.

C. SOUTH BLOCK

WINDOW						WINDOW	
FRANCIS ANDERSON	LIZZIE GUNNELL	ALICE WILLIAMS		BELLA KEEFE			JOHN TIPPET
ANNIE FREEMAN	KATE WALKER	ETHEL COX		KATE NORTON	MARIE BURREL 26/5/-6/6/		LILY SMITH 12/6/-16/6/
MAUD BASHAM	LILY BOUCHIER 14/6/-17/6/	MABEL COX		HANNAH TIPPET			VIOLET RAMSDALE 14/6/-17/6/
FIRE PLACE	UPPER DORMITORY RESTRICTED TO CHILDREN BETWEEN 6 & 15 YRS OF AGE						DOOR
MAUD SMITH 12/6/-13/6/	FLORRIE POPE	EDITH PEPPER		SUSAN FOX 12/6/-16/6/	NELLIE GATTY		MINNIE BUTLER
LILLIE SEDGWICK 12/6/-15/6/	ANNIE KENNEDY 12/6/-15/6/			FLORENCE FULLER 10/6/-13/6	DAISY BARRETT 13/6/-17/6/		FLORENCE CUMMINGS 13/6/-17/6/
	MAY MACH	EMILY BEAUMONT 14/6/-17/6/		FLORRIE HUMPHRIES	GEORGE DOY		GERTRUDE BAKER 12/6/-13/6/
WINDOW						WINDOW	

N.B.—Names underlined = diphtheria cases. Dates = those of sickening, or showing bacilli, and removal to hospital respectively.

TABLE IV.

C. South Block Outbreak.

Incubation Period of Diphtheria = 2 to 12 Days.

Willie Jarvis, 22/4 – 25/4.
Harry Jarvis, 26/4 – 3/5.
Alice Jarvis, 23/4 – 1/5.
[illegible] 23/4 – 29/4.
Suspicious throat cases admitted from Main Building, Receiving or Probation Wards, 1/5, 5/5, 6/5 and 10/5.

Infirmary Infected, with Diphtheria and Vincent's Angina or Ulcerative Stomatitis.

Walter Button, 16/5 – 18/5. (from E.S. on 26/4, with conjunctivitis and debility).

Kate Hemmings, 11/5 – 17/5. (from C.S. on Feb. 3rd with tonsillitis and stomatitis).

C. South Block. Joseph Tipper, 28/4 – 7/5.

Jane Sutton, 27/4 – 29/5. (from C. North on 1/5, with conjunctivitis).

Alice Trebett, 1/5 – 5/5. (from D. North on 7/5, with seborrhœa)

Lower Dormitory.

1. Emily Grantham 10/5 – 10/5.
2. Florence Cooper 12/5 – 17/5.
3. Dolly Wilson 14/5 – 16/5.
4. David West 16/5 – 17/5.
5. Francis Clarke 26/5 – 26/5.
6. George Smith 1[illegible]/6 – 6/6.

Upper Dormitory.

1. Florence Cummings 8/5 – 17/5.
2. Marie Barrell 2/5 – 4/5.

Lower Dormitory.

1. Lily Rachel, 8/6 – 9/6.
2. Walter Power, 8/6 – 9/6.
3. Sydney Eyre, 9/6 – 13/6.
4. Charles Bartley, 12/6 – 16/6.
5. Emma Foulger, 12/6 – 17/6.
6. Charles Norris, 12/6 – 16/6.
7. Fred Cherry, 13/6 – 16/6.
8. Charles Fox, 14/6 – 16/6.
9. Arthur Cooper, 14/6 – 17/6.
10. Doris Bissmore, 18/6 – 21/6.
11. Elizabeth Locke, 27/6 – 30/6.

Upper Dormitory.

1. Florence Fuller, 10/6 – 13/6.
2. Maud Smith, 12/6 – 15/6.
3. Susan Fox, 12/6 – 16/6.
4. Lillie Sedgwick, 12/6 – 15/6.
5. Annie Kennedy, 12/6 – 15/6.
6. Gertrude Baker, 12/6 – 16/6.
7. Lily Smith, 12/6 – 16/6.
8. Lily Bouchier, 14/6 – 17/6.
9. Violet Ramsdale, 14/6 – 17/6.
10. Emily Beaumont, 14/6 – 17/6.
11. Daisy Barrett, 15/6 – 17/6.

N.B.—Julia Bell (aged 21 years), an attendant in C South Block, sickened June 21st, and was removed to Hospital on June 24th.
Philip Jones was admitted on May 6th into Receiving Ward from Lambeth with enlarged tonsils, which ulcerated on May 17th.

TABLE V.

RECEIVING WARD OUTBREAK. INCUBATION PERIOD OF DIPHTHERIA = 2 to 12 DAYS.

Bridget Archer,

(Entered Receiving Ward June 16th from Lambeth Workhouse, and was removed to Hospital June 17th)

16/6.—17/6.

Mildred Bounds 17/6.–21/6.	Jas. Bounds 18/6.–21/6.	Alice Bounds 20/6.–22/6.	Daniel Mumford 19/6/–21/6.	Florence Nicholls 19/6.–22/6.	Alfred Nicholls 21/6.–24/6.	Christopher Eslin 20/6/. 23/6/.	Geo. Eslin 18/6/. 22/6/.	Ellen Archer 18/6/.–22/6/.

Alfred Grubb 24/6.–28/6/.	Robert Beckett 26/6/.–30/6/.	Sarah Greenwood 27/6.–30/6/.	Rosina Hicks 28/6/. 30/6/.	Frederick Marshall 28/6. 30/6/.	Florence Marshall 29/6/.–1/7.	John Mumford 1/7.–4/7/.

N.B.—George and Christopher Eslin may have contracted the infection from Bridget Archer at the Workhouse. They were all three removed to the Receiving Ward from the Workhouse on June 16th.

The dates after the names in Tables IV. and V. are those of sickening (or showing the presence of Diphtheria bacilli in the throats or noses) and removal to Hospital respectively.

TABLE VI.

Showing the results obtained from the 1,332 Bacteriological Examinations carried out at the Lambeth Bacteriological Laboratory in connection with the Diphtheria outbreak at the Lambeth Parochial Schools.

——	Lambeth Parochial Schools.	Lambeth Work-house.	Lambeth Infirmary.	Totals.
Klebs-Lœffler bacilli (pure cultivation).	12	5	2	19
Klebs-Lœffler bacilli + staphylococci.	18	2	3	23
Klebs-Lœffler bacilli + streptococci.	9	2	1	12
Klebs-Lœffler bacilli + staphylococci + streptococci.	4	—	1	5
Klebs-Lœffler bacilli + Pseudo (Hoffmann) bacilli + staphylococci.	3	1	—	4
Klebs-Lœffler bacilli + streptococci + torulœ.	1		—	1
Staphylococci	374	76	35	485
Streptococci	27	2	1	30
Staphylococci + streptococci	371	37	50	458
Staphylococci + sarcinœ	12	3	4	19
Staphylococci + torulœ	35	4	4	43
Staphylococci + micrococci	3	—	2	5
Staphylococci + diplococci	1	—	—	1
Staphylococci + smegma	1	—	—	1
Streptococci + torulœ	3	—	—	3
Streptococci + micrococci	6	—	3	9
Streptococci + staphylococci + torulœ.	17		7	24
Streptococci + staphylococci + sarcinœ.	12	12	—	24
Pseudo (Hoffmann) bacilli	13	—	5	18
Pseudo (Hoffmann) bacilli + staphylococci.	77	1	7	85
Pseudo (Hoffmann) bacilli + streptococci.	1	—	—	1
Pseudo (Hoffmann) bacilli + staphylococci + streptococci.	47	—	2	49
Pseudo (Hoffmann) bacilli + staphylococci + micrococci.	4	—	—	4
Pseudo (Hoffmann) bacilli + staphylococci + torulœ	—	—	6	6
Pseudo (Hoffmann) bacilli + torulœ.	1	—	—	1
Pseudo (Hoffmann) bacilli + streptococci + sarcinœ.	2	—	—	2
	1,056	145	133	1,332

N.B.—Vincent's organisms were found definitely in 7 instances, viz.:—with Klebs-Lœffler bacilli 1, with Pseudo (Hoffmann) bacilli 1, with Pseudo (Hoffmann) bacilli and staphylococci 2, with Klebs-Lœffler bacilli and staphylococci 1, with doubtful diphtheria bacilli and staphylococci 1, with doubtful diphtheria and streptococci and sarcinæ 1; and doubtfully in three instances, viz.:—with streptococci and staphylococci 1, with staphylococci and doubtful diphtheria bacilli 2.

Prize Essay.

THE NATURE AND TREATMENT OF ANGINA PECTORIS.

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INTRODUCTION.

Hebeden, in 1768, applied the term "angina pectoris" to a sudden, severe pain, in the præcordial region, associated with a feeling of great anxiety. The first difficulty in the explanation of the nature of angina pectoris, in 1906, is to know what varieties of cardiac pain are to be included. Pain over the region of the heart is common; the severe attacks first described as angina pectoris are rare; let us then call these severe attacks true angina pectoris, and deal chiefly with them. The conditions known as toxic angina, pseudo-angina, and angina *sine dolore*, are less definite, in some cases no doubt allied; but, so far as this paper is concerned, the discussion of them at any length, would only complicate matters and too much increase its scope, and I therefore refer to them chiefly in order to justify the use of the term, true angina pectoris.

THE NATURE OF ANGINA PECTORIS.

(*a*) *Clinical Nature.*—True angina, from a clinical point of view, is characterised by sudden attacks of severe pain over the region of the heart, and extending into the arms and neck, more particularly on the left side; besides the actual pain there is a feeling of distress, which is perhaps unequalled in any other disease. The onset is sudden, the duration short, varying from a few seconds to a minute or two; and frequently there is some definite exciting cause. One of these attacks may be fatal; they tend to recur. The exciting causes may be dealt with when considering treatment, and to conclude a sketch of the clinical nature, it is only necessary to add that it is much more frequent in men than in women; almost unknown before middle age is reached

and, on physical examination, the arteries are commonly found to be thickened; there may be evidence of diseased aortic valves, of myocardial degeneration of the heart, or an aortic aneurysm may be present. The frequency of occurrence, and the severity of the attacks, may vary greatly.

To draw a sharp line between such cases and other varieties of præcordial pain is, of course, impossible; it is always hard, in any disease, to estimate the degree of intensity of pain; one way of making the distinction in angina pectoris, and perhaps the best, is to reserve the name true angina for those cases only in which the pain radiates into the arm, but though a distinction easy to make, it cannot be regarded as final. The pain in toxic angina from tobacco, tea, etc., the pain in cases of aortic regurgitation, of rheumatic origin, may be most severe, but is usually confined to the præcordial area. In cases of aortic aneurysm, besides the more constant præcordial pain, paroxysmal attacks of true angina pectoris may occur. The term pseudo-angina is usually applied to the cardiac pain, frequently lasting a long time, sometimes periodical, which is not uncommon in neurotic patients, especially women; but it has been applied to any cardiac pain that is not regarded as true angina. No doubt it is best, when possible, to avoid its use.

(*b*) *Pathological Nature.*—In fatal cases, on post-mortem examination, the heart has been found dilated, with the cavities full of blood; the most constant changes met with in the morbid anatomy are: atheromatous degeneration of the coronary arteries, producing narrowing, or the narrowing has been at their orifices from atheroma of the first part of the aorta; and not infrequently the aortic valves are affected. The heart may show myocardial degeneration. Of these changes, the narrowing of the coronary arteries from atheroma, is usually regarded as the most constant and the most important.

There are many theories put forward to explain the pathology of angina pectoris. The pain is undoubtedly in the cardiac plexus, and radiates to adjacent nerves: the fact that the cardiac branches of the sympathetic system are from the same segment of the spinal cord as the sensory branches of the ulna nerve, will explain the radiation into the arm; but

the suggestion that angina pectoris is due to neuralgia is hardly compatible with the sudden onset, often with exciting cause, cramp-like character of the pain, and the short duration. Local degeneration of arteries has been recorded in some cases of neuralgia, but there must be few opportunities of thoroughly examining the arteries in cases of neuralgia, and frequently it occurs in young people who apparently have normal ones.

Obstruction of the coronary arteries will cause sudden death; and this may explain some fatal cases, but it is not easy to account for the pain, although it has been suggested that partial obstruction may lead to dilatation of the heart, with stretching of the nerves, which hypothetical condition is compared with the pain of a distended bladder. The pulse, however, may continue throughout the attack, with very little change, which is hardly compatible with such a dilatation, and the state of the heart post-mortem, depending as it does on the presence or absence of rigor mortis, is not trustworthy.

The successful treatment by amyl nitrite suggests that a feeble heart is striving to overcome a high, or suddenly increased, peripheral resistance in the smaller arteries, and perhaps this is the most probable pathology. It is not, however, always easy to demonstrate the increased arterial tension.

Another view, that it is due to temporary anæmia of the heart muscle, or part of it, which is relieved by amyl nitrite dilating the coronary arteries, is held, but the action of amyl nitrite on the coronary arteries is not known.

There was an old theory of its being a "convulsion of the heart"; and, from the character of the pain, cramp of the heart muscle has been suggested; the continuance of the pulse would seem to make this impossible, though cramp of certain areas of the heart muscle might be an explanation.

Dr. Wm. Russell, in a recent article,[1] holds that contraction of the systemic arteries during digestion is normally present, and is due to a vasomotor reflex. He regards angina pectoris as a morbid contraction, due to a hypersensitive vasomotor centre. Most cases, he considers, are due to absorption of substances from the alimentary canal, and his success by

[1] "The Relation of Angina Pectoris and allied conditions to an Arterio-cardiac Reflex having its Origin in the Abdomen," *Brit. Med Journ.*, February 10, 1906.

dietetic treatment appears to justify the conclusion. In those cases which he thinks are due to physical exertion, or emotion, he assumes a hypersensitive vasomotor centre. In his paper, however, a very wide significance is given to the term angina pectoris.

To sum up, it is difficult to know whether to try to explain all varieties of cardiac pain by one pathology, or whether to limit the discussion to what we may call true angina pectoris. Having chosen the latter course, we may assume that atheroma of the coronary arteries is an important factor; and probably the best explanation is, that a feeble heart is trying to overcome an increased peripheral resistance.

TREATMENT.

1. *Relief of the Attack.*—In a severe attack of angina pectoris, amyl nitrite must be inhaled at once; a capsule, containing three or five minims, should be broken in a handkerchief and the vapour inhaled; if this fails to relieve in a minute or two, chloroform may be tried, which is best administered, on a sponge, in a smelling bottle, by the patient himself; and for pain which is persistent, morphia, gr. ¼ hypodermically, is required, which, in a feeble patient, may be counteracted by the injection of Liq. Strychninæ Hydrochlor. ♏ iii. At the same time, if at hand, the following stimulant should be taken:—

℞ Sph. Aetheris - - - - ♏ xxx.
Sph. Ammon. Aromat. - - - ♏ xxx.
Aq. Camphoræ - - - ad ℥i.

Or failing that ℥ss. of brandy.

As an alternative for amyl nitrite, one or two minims of Liq. Trinitrini (B.P.) or one or two of the Tabellæ Trinitrini (B.P.) may be taken; amyl nitrite usually acts more promptly, but in some cases, one of these latter will relieve where amyl nitrite fails. Sodium nitrite, in two and a half gr. tablets, is recommended for pain that is not readily relieved by the above nitrites; the dose is one to four tablets.

Erythrol tetranitrite, one gr. in alcoholic solution, is said to be more lasting, and is therefore useful in cases where there is quick recurrence, and the same may be said, to a less degree, of sodium nitrite. Of other vapours recommended,

iodide of ethyl, bromide of ethyl, and pyridene are the most common, and may be tried in intractable cases; the last is most objectionable and it is not usual to require any of them. In mild cases, or for pain persisting after the attack is much relieved, hot applications to the præcordium are often comforting. When the attack is relieved, the patient should rest, avoid all exciting causes and confine himself to a very light diet; probably for the remainder of that day at any rate, a strict milk diet, with perhaps Benger's Food, and arrowroot, is the best. Alcohol is best avoided, unless absolutely necessary.

When these attacks have been declared, a course of nitrites is often very beneficial, let the patient take

℞. Liq. Trinitrini - - - - ♏ i.
Tinct. Card. Co. - - - - ♏ xxx.
Spt. Chlorof. - - - - ♏ x.
Aq. - - - - - ad ℥ i. t.d.s.

Professor Osler recommends that the dose should be gradually increased, every five or six days, till headache and flushing are produced. The nitrates may be taken for several weeks; perhaps the most difficult cases are those where there is a tendency towards failure of compensation of the heart, as the liq. trinitrini may increase this, and the administration of digitalis may bring a return of pain. These patients must be kept in bed, or on a couch, while the liq. trinitrini is given, and, instead of digitalis, caffeine and nux vomica may be used.

℞. Liq. Trinitrini - - - - ♏ i.
Caffein. Cit. - - - - - gr. v.
Tinct. Nuc. Vom. - - - ♏ viii.
Syr. Aurant. - - - - - ʒss.
Aq. - - - - - ad ℥i t.d.s.

The diet should be of a light farinaceous character, eggs lightly boiled and fish may be allowed; but in severe cases, peptonised milk, or milk and barley water only should be taken for a short time.

2. *To avoid Attacks.*—The most important point, for the patient who is liable to angina pectoris, is the regulation of his life, in such a way, that he may avoid all forms of exciting cause. The exciting causes are very variable; probably the most common are physical exertion, and distension of the stomach, and perhaps emotion should come third. Hurrying

for a train; walking fast up hill; all forms of exertion, especially after food, must be avoided. Mental excitement, business worry, anger, or emotion of any kind may set up an attack. Exposure to cold, bathing for example, substances that have a toxic action on the heart, as tea, tobacco, coffee and alcohol, are all exciting causes which must be guarded against. An even, quiet life, free from excitement, with plenty of fresh air, and very gentle exercise, is what is needed; warm clothes in the winter, and for the proper action of the skin, warm baths are required.

The diet should consist of white boiled fish, eggs lightly boiled, and milk puddings; fresh meat may be allowed and is best underdone. Plenty of water, or some mineral water, as Apollinaris should be taken. Vegetables, and other articles, likely to cause flatulence must be avoided. The meals should be taken regularly, and no supper allowed. The bowels must be kept acting regularly by a so-called "dinner pill," of aloes and nux vomica; or an occasional dose of calomel, gr. ½ or 1, followed next morning by Carlsbad salts ʒi, may be taken. A digestive tonic may at times be beneficial, for example:

℞ Sod. Bic. - - - - gr. xx.
Tinct. Aurant. - - - - ♏ xx.
Infus. Calumb. - - - ʒ ss.
Aq. Chlorof. - - - - - ad. ʒi t.d.s. a.c.

or

℞ Acid Nit. Hydrochlor. Dil. - - ♏x.
Tinct. Nuc. Vom. - - - ♏ viij.
Tinct. Aurantii - - - - ♏ xx.
Aq. - - - - - ad ʒi t.d.s. p.c.

Of drugs which may have a curative action, potassium iodide, in large doses (gr. x. to xx. t.d.s.), is very strongly recommended, by Sir Lauder Brunton, in arterial degeneration. It is administered, of course, freely diluted with water, to prevent iodism, and its effect must be carefully watched. Arsenic and strychnine combined have given benefit in some cases.

℞ Liq. Strychnin. Hyd. - - ♏ iii.
Liq. Arsenic. Hyd. - - - ♏ iii.
Tinct. Aurant. - - - ♏ xx.
Aq. - - - - - ad ʒi. t.d.s. p.c.

Potassium bromide, in neurotic cases, is very beneficial, and may be added to the alkaline digestive tonic prescribed above. Where both anæmia and valvular disease of the heart are present, digitalis and iron may well be combined.

℞ Tinct. Digitalis - - - ♏ x.
Liq. Ferri Perchlor. - - - ♏ xv.
Acid Citric. - - - gr. v.
Syr. Limon. - - - - ♏ xxx.
Aq. - - - - - ad ℥i. t.d.s. p.c.

but it must be remembered, that digitalis may increase the pain, and if arterial tension is high, caffeine citrate and nux vomica will be better. It has been stated, that cocaine will prevent the recurrence of angina pectoris, but probably it is not a safe remedy.

In some cases, in which there have been premonitory symptoms, the application of the constant electrical current over the vagus in the neck has effectually warded off the attacks.

For the treatment of the other varieties of pain, not true angina, the main indication would be, to avoid the poison in toxic angina; to give general tonic treatment, and bromide of potassium in pseudoangina; and rest, with sometimes nitrites, in valvular disease of the heart. In all these cases the diet will require carefully regulating. The treatment of angina, associated with an aortic aneurysm, or aortic regurgitation from atheroma of the valves, requires no special comment, though the prognosis is more grave.

The great essentials, then, in the treatment of angina pectoris are a quiet life, a wise diet, and the administration of nitrites in an attack. A patient subject to angina should carry amyl nitrite capsules, or the Tabellæ Trinitrini.

NOTES FROM FOREIGN JOURNALS.

TREATMENT OF PHTHIRIASIS WITH XYLOL.

Sal[illegible], in *La Clinica*, recommends this substance, a coal-tar derivative, well known as a solvent of fat. When pure, xylol produces rather a brisk smarting if applied over a large extent of skin; it is better, therefore, to use it diluted. Like benzine, petroleum-ether and similar substances, it is not miscible with water or aqueous solutions. Salomoni advises that in practice the mixture should be composed of equal parts of xylol and spirits of ether (Hoffmann's solution). This should be freely rubbed into the parts infected, using for the purpose a large wash-leather, well thoroughly soaked with the mixture.

The result is complete and immediate. The liquid is perfectly clean and innocuous, losing its ethereal smell when evaporation is over. At the same time it penetrates and destroys all the vermin that it touches, and, if the application is made thoroughly, it penetrates the nits almost as quickly as the live vermin. These are loosened from the hairs, and can be drawn off like rings by using a comb. No painful effects follow the use of this solution, which waters the eyes, blanches it, and, at the same time, removes the latter completely. No traumatic eruption or dermatitis is caused, even in the pubic region, the groins, and the axillæ, where the skin is thin and sensitive.

Immediate use, even if repeated every day for a week, produces at most a temporary result very like that following a single application of tincture of iodine. Thus, the only disadvantage, is really very trivial, compared with the intense dermatitis, often so painful, which follows the use of the traditional grey ointment, when that repulsive-looking drug has been badly, or too lavishly applied, or has been left in place too long—in consequence, as a rule, of improper or careless washing. (*Journal de Médecine et de Chirurgie pratiques.*)

FOR MOSQUITO-BITES.

Xylol has been found useful for allaying the irritation of mosquito-bites. Joly, of Bagnères-de-l'Orne, has published the following prescription:—

℞.	Liq. Formaldehyd. (40 per cent.)	ʒiv.
	Xylol.	ʒiss.
	Acetoni	ʒi.
	Balsam. Canaden.	gr. xv.
	Ol. Citronellæ	q.s. M.

To apply.—Shake up the mixture well, and touch the bite with the cork, or a small pledget of wool; leave it to dry on the skin. (*Journ. de Med. et de Chir. prat.*)

DIET FOR GASTRO-ENTERITIS IN CHILDREN.

Masson, of Montreal, insists on the necessity, which often arises, of giving a feculent diet in these cases before giving milk. He considers such a diet to be a valuable resource in cases which cannot tolerate or be given milk for some reason or another.

At first, decoctions of barley and of rice were given, but the flavourless taste of these nauseated the children, and the constant loss of weight necessitated other methods. A useful recipe is that of Terrier, as modified by Méry:—

Potatoes	2½ ozs. of each.
Carrots	
Turnips	1 oz. of each.
Split peas or haricot beans	

Place all these in 3 litres of water and boil for four hours, then add a teaspoonful of table-salt and pass through a fine sieve.

In this way, about a litre of clear brownish bouillon is obtained, which separates into two parts on standing; the upper part being salt water, and the lower containing grains of cooked starch. The quantity of this to be given to the child is the same as that of milk which would usually be given. If this bouillon has been passed through a sufficiently fine sieve, it can be given to a hand-fed infant without any trouble. Masson adds, from the second day, to each bottle when it is about to be given, a teaspoonful of ground-rice, or of fine wheaten flour, previously stirred up in two teaspoonfuls of cold boiled water; hot-water makes a glutinous mixture with lumps, which render it unfit for use. The mixture of flour and water is poured into the "feed" of bouillon warmed in a bain-marie. This diet is kept up for four or five days, but may be continued up to ten or fifteen without ill effects. The results are very good, for, instead of losing weight, the little patients often gain 3 or 4 ozs. a day. Rachitic, or atrophic, children may sometimes develop œdema, but this may be remedied by substituting sugar for salt, or by giving milk, if the child's condition will allow of it. (*Revue de thérapeutique médico-chirurgicale.*)

HYPERIDROSIS AND BROMIDROSIS OF THE AXILLÆ.

Leredde remarks that the treatment of axillary hyperidrosis is difficult, because it is almost impossible to apply to the axilla the permanent dressings, which do so much good in plantar hyperidrosis, but, on the other hand, sweat affections are of less importance in the axillæ than in the feet, and do not entail the same consequences.

In order to diminish the daily amount of sweat excreted in the axillæ, it is well first of all to find out the state of the digestive functions; hyperidrosis is common in fermentative dyspepsia. It is specially frequent in fat people, and its presence may provide an additional reason for treating the obesity.

The most certain method of treatment is by X-rays. These are allowed to act in a certain way solely upon the glandular epithelium, and thus to cause atrophy of the secretory cells. Small doses (2 or 3 of Holzknecht's units) repeated every fortnight, or three weeks, will act without danger, and will not even bring about any reddening, if care is taken thoroughly to dry up all the sweat excreted during the application.

The older methods of treatment are, however, by no means to be considered as inefficient. In practice it is often sufficient to bathe the axillæ morning and evening with cotton wool and alcoholic solution of sublimate (1 in 250) or resorcine (3 per cent.), and then to powder freely with talc or oxide of zinc, to which may be added bismuth, salicylic acid, tannaform, or naphthol.

One of the following may be used:—

℞. Talci. - - - - - - - ʒss.
Tannaformi - - - - - - ʒi.
M.

or

℞. Acidi Salicyli - - - - - - gr. xv.
Magnesiæ - - - - - - ʒij.
Talci - - - - - - - ʒss.
M. Ft. pulvis.

At night a paste containing resorcin and pyrogallic acid can be applied:—

℞. Pyrogallol. - - - - - -) āā 3ss.
Resorcin. - - - - - -)
Zinci Oxydi - - - - - 3ss.
Lanolini - - - - - -) āā 5iij.
Vaselini - - - - - -)

M. Ft. Ung.

Twenty drops of lemon juice should be added to the above. It must be cleaned off each morning by the use of oil of sweet almonds, after which powder must be applied.

If bromidrosis is present, the skin must be treated more actively. The X rays are particularly useful, and certain disinfectants must be used. Lereddé himself prefers bathing the axillæ with a 1-in-500 solution of permanganate of potash every two or three days. A strength of 1-in-300 may even be used, or alcoholic solution of formol (5 or 10 per cent). Other authors recommend chromic acid in aqueous solution (1 in 500–1000): the action of this must be strictly confined to the axillary regions in order to avoid toxic symptoms. Nitrate of silver in solution is also used.

In women, one of the causes which give rise to and keep up hyperidrosis in the axillæ, is the use of india-rubber "dress-protectors," which heat and irritate the skin. When worn these rubber shields should be well-covered with gauze, which will absorb the excessive perspiration. (*Journal des Praticiens.*)

PREVENTIVE TREATMENT OF SCARLATINAL NEPHRITIS.

Lowenburg deals with this subject in the *Journal of the American Medical Association*. The sick-room must be well-ventilated and kept at an uniform temperature of 68° to 70°, draughts and sudden changes being avoided.

The diet must be carefully regulated, and the best diet is milk. When the child is breast-fed, the mother's milk may be obtained by means of a breast pump. For older children, the milk may be given undiluted, or with the addition of a little barley water, lime water, or Vichy, and it should be peptonised, if digestion is weak. Milk should be practically the only food for a period of four to six weeks, or until desquamation is over. Fruit juices are refreshing, and are useful as they make the urine alkaline. When desquamation is nearly finished, the diet may be cautiously increased by adding cooked vegetables, fruits, and farinaceous food. Proteids may be given very carefully and in small quantity; increasing as tolerance is established. The urine must be tested daily, and on the appearance of the least trace of albumin, absolute milk diet must be adopted again. Lowenburg looks upon a free and continuous use of water as doing the greatest service in preventing nephritis, because thereby the amount of urine is increased, any toxic matters are diluted, acidity is lessened, and the kidney is spared irritation. The elimination of toxins is promoted by free action of the bowels and of the skin. Water can be used in three ways:—by the mouth, by the rectum, and in baths; all of these methods can be combined to obtain the best result. Lowenburg orders a definite amount of water to be taken during the day between meals, and allows it plain, as one of the mild mineral waters, or as lemonade or orangeade. To either of the latter it is an advantage to add cream of tartar, one teaspoonful to the pint.

A bath should be given daily, followed by friction; this not only reduces temperature, but, by increasing capillary circulation, relieves internal congestion. In giving the bath, great care must be taken to avoid chilling the surface. The child should be wrapped in a blanket and completely immersed. A warm dry blanket must be ready to receive the patient when the bath is finished. In this way a free action of the skin is promoted. If a bath is not possible, sponging should be undertaken, but the whole surface of the body must not be exposed at one time for this purpose. The temperature of the water must never be more than ten degrees lower than the temperature of the patient, five degrees may even be sufficient. In the case of infants and young children, a warm bath is necessary. Enteroclysis should be carried out once or twice a day, from one to eight ounces of normal salt solution being injected. This is a valuable prophylactic agent; it lessens thirst, reduces fever, prevents constipation and diminishes toxæmia, and the risk of irritation of the kidneys.

The only drugs used are alkalies and laxatives, for Lowenburg considers that urinary antiseptics, such as urotropin and the like, have really no controlling influence, so that their use is needless and expensive. Citrates, acetates, and salts of the other organic acids are useful for their well-known antacid effects on the urine, and are given in doses of five to ten grains. Small doses of calomel, followed by salts, should be given every three or four days. The author prefers to give "broken" doses, and recommends the following as convenient:—

℞. Magnes. Sulph. - - - - - gr. v–x.
Acid. Acetic. Dil. - - - - - - ♏ v.
Syrup. Zingiberis - - - - ♏ xx.
Aq. destill. - - - - - - - ad ʒj. M.

One teaspoonful every two or three hours in water.

The use of antistreptococcic serum, though favourably influencing the graver forms of scarlatina, does not appear to prevent the occurrence of nephritis, or other complications.

THE USE OF CALOMEL IN THE TREATMENT OF ECLAMPSIA.

W. Reynolds Wilson read a paper on this subject, at a meeting of the Philadelphia County Medical Society, which appears in the *Therapeutic Gazette* for May. He thinks that the investigations recently devoted to the subject of eclampsia have determined two important facts, one being that the syncytial cells produce within the maternal organism a direct poison, or one which is the result of an improper neutralisation of their presence in the blood; while the second is, that the liver and kidneys, in the presence of this poison, are both affected; the former in its capacity for the conversion of the waste products of metabolism, the latter in their ability to eliminate the toxic elements in the blood. Besides the function of the liver in converting albuminous substances into urea, it is necessary to have regard to the antiseptic and depurative action of the bile. It is known that certain chemical poisons are carried off by the bile, and it is possible that a free flow of bile may help to eliminate the toxin of eclampsia. The antiseptic action of bile is of first importance in the presence of the intestinal fermentation which occurs in many cases of threatened eclampsia, and which may be considered as a secondary factor in commencing toxæmia.

Catharsis has played a conspicuous part in the treatment of eclampsia, elimination being favoured, and the function of the liver stimulated, and, in view of this, it is surprising that calomel has not been more used. The ordinary purgative doses, however, do not go very far in eliminating the eclamptogenic poison. Larger doses probably carry off, so far as the liver is concerned, the toxic ingredients in the blood, first through its hydragogue action, and secondly by increase in the flow of bile.

The use of calomel as a purgative has overshadowed its use as a diuretic, though the latter can be seen in the directly stimulating effect produced in cases of acute nephritis in which the epithelium of the tubules is not destroyed. It has been proved by experiment that a solution of an organic combination of mercury in the blood will, in the absence of any interruption in the blood current in the kidney, almost double the rapidity of the circulation. Heuck and Biegonski noted that, in parenchymatous nephritis, diuresis was lessened on first administering calomel, but on the third or fourth day a paroxysmal polyuria occurred. Other observers testify to the great practical value of calomel as a diuretic. Wilson relates six cases of eclampsia which were treated with large doses of calomel. Five of these recovered, the fatal case had a history of alcoholism, and was most probably suffering from chronic nephritis. The calomel was ineffective in this case from non-absorption, for no cathartic action followed the administration of a large dose. The drug must be energetically given, both in the pre-eclamptic stage and in the convulsive. In the former case, the outlook is so threatening that the time for treatment is limited. A dose of ten grains should be given at once, followed, if necessary, by another in from four to six hours. The effect may be judged by the increase in the amount of and the reduction of the specific gravity of the urine. This, and not the presence of or absence of diarrhœa, is the important point.

In the convulsive stage, a dose of twenty grains is given, followed by half this amount in the intervals between convulsions, as opportunity arises, or according as the patient can swallow. If the patient is somnolent, or if the convulsions follow each other in quick succession, advantage must be taken of the first opportunity to give the maximum dose of twenty-five grains. If the kidneys are known to be affected, smaller doses may be given more frequently—two grains every six hours. Heuck's objection to the use of calomel is that, in acute conditions, the tubules are blocked by desquamative debris, and that this interferes with the output of urine. Wilson does not think this a valid objection from a practical point of view, but acknowledges that the initial decrease in excretion, met with in some cases, may be accounted for in this way. In cases with no previous history of kidney trouble, convulsions are best controlled by morphia. The use of calomel prevents some of the undesirable effects of morphia, and *vice versa*, the use of morphia, especially if combined with atropine, counteracts salivation and excessive diarrhœa due to calomel.

EPILEPSY AND THE SALT-LESS DIET.

Three Italian physicians have made a study of the influence of diets, free from salt and reduced in salt, upon epileptics, and upon the treatment by bromides. They have come to the following conclusions.

The salt-free diet notably diminishes, in all epileptics, the number and violence of the attacks; in some cases they were kept away for some months. The reduced salt-diet only diminishes the number of fits. To reduce their number and violence to any extent it was only necessary to give, at the same time, small doses of bromide. In the milder forms of epilepsy, the salt-free diet is sufficient to diminish, and even to suppress, the disease for a long time; in the more severe forms, bromides must be given as well. A salt-free diet by itself, or in combination with bromides, even when kept up for some years, does not produce on the patients any disturbance of the general condition, either of body or mind. (*Revue de Thérapeutique Medico-Chirurgicale*, 15 June 1906.)

USE OF ADRENALIN IN THE PERITONEAL CAVITY.

Emery Marvel has found the use of adrenalin in warm normal salt solution of considerable benefit in controlling the oozing, where old adhesions have been separated, and in preventing or limiting the adhesions forming from acute exudative peritonitis, or re-forming, when old adhesions are separated. He gives details of a case, in which an operation for intestinal obstruction was necessary eight weeks after the removal of a suppurating, but intact, appendix. The obstruction was due to adhesions binding together about 10 feet of small intestine, the cæcum, and the omentum. When all adhesions had been freed, all the surfaces were oozing, the serous coat was detached in seven places, and a perforation had occurred in one. After washing with salt solution and replacing in the abdomen, one quart of normal salt solution, containing one fluid drachm of adrenalin solution, was introduced into the peritoneal cavity. The patient was then *in extremis*, but the adrenalin effectually counteracted the shock, and eventually, as was found by an operation six months later, prevented the adhesions from re-forming.

Marvel's practice is to apply adrenalin to the surface, and to leave it free in the peritoneal cavity, when there is acute inflammation with exudation, or when raw surfaces are present which are likely to be left exposed. He uses one drachm of adrenalin solution to one or two pints of warm normal solution. Dilution modifies the action of the drug, favours more prolonged influence of its action, and supplies fluid to the blood. Salt solution is used as being chemically the most compatible with adrenalin; least irritating to the tissues; the best solvent of serous exudation; the most easily absorbed, and, when absorbed, the most easily mixed with the blood. After an experience of 28 cases, he concludes that adrenalin can be safely used in the peritoneal cavity; when shock or depression exists while the peritoneum is open, it offers the most convenient method, being more effectual than intravenous infusion; it controls peritoneal oozing, and prevents peritoneal adhesions from forming. (*Therapeutic Gazette*, June, 1906.)

Reviews of Books.

The Accessory Sinuses of the Nose. By Professor GUSTAV KILLIAN. Translated by Dr. D. R. PATERSON, Assistant Physician in charge of the Throat Department, Cardiff Infirmary. Illustrated by 15 coloured plates. London: Williams & Norgate. 25s.

WHOEVER has to carry out treatment in the complex, variable, and dangerous neighbourhoods of the pneumatic spaces of the nose should make himself practically acquainted with their surgical anatomy, by frequent examination and handling of anatomical specimens. This may appear a counsel of perfection, and there are many surgeons, ophthalmologists, neurologists, and general practitioners—who can appreciate the importance of these cavities from the study of well-prepared illustrations. Of such illustrations lately there has been no end, but the atlas prepared by the distinguished Professor of Freibourg is distinctly *sui generis*, and in many ways eclipses all its predecessors. Dr. Killian found that, if the mucous membrane of the sinuses was treated with a solution of formalin, it could be detached with great ease from the bone, and had a firm consistency, moreover, it showed no inclination to tear, and was so elastic, that, after being compressed, it readily resumed its normal form. In this way the original configuration of the cells is retained by the mucous sacs, and each accessory sinus retains the form of a soft mucous bag which can be easily displaced, or replaced. By the removal of part of the overlying bone, the shape, expansions, and relation of the cavities can be well displayed.

This has been done in fifteen beautifully coloured plates. The accompanying letterpress is deeply instructive, and has been rendered into such fluent English by Dr. Paterson that it is a pleasure to read it. He has rendered the anatomical terms into English, instead of retaining the Latin nomenclature used in Germany, and the only one, which he seems to have overlooked, is the maintenance of the term "hypophysis," which many students unacquainted with German would fail to recognise as indicative of the pituitary body.

Rhinologists all over the English speaking world, as well as neurologists, ophthalmologists, and every surgeon, who approaches pyogenic inspection of the cranial cavity, owe a deep debt of gratitude to Dr. Paterson for making the work of the small but renowned clinic of Freibourg known to a still wider range of students.

Textbook of Diseases of the Ear, Nose and Naso-Pharynx. By D. B. ST. JOHN ROOSA, M.D., LL.D., Professor of Diseases of the Eye and Ear in the New York Post-Graduate Medical School and Hospital, Consulting Surgeon to the Brooklyn Eye and Ear Hospital, formerly President of the New York Academy of Medicine, etc.; and BEAMAN DOUGLASS, M.D., Professor of Diseases of the Nose and Throat in the New York Post-Graduate Medical School and Hospital, Fellow of the New York Academy of Medicine, etc. Pp. 621, 108 figures. London: Macmillan & Co., Ltd.

THIS book deals in its first forty-five pages with the examination of aural patients, and the chapter on this subject is in some respects very

admirable, but in others, it falls far below the standard of text-books to which the medical profession has now access. For instance, in the testing of hearing, the only tuning fork which receives any attention at all is that of the C2, and the only test with this tuning fork which is alluded to is that of Weber. Such a peculiar selection of a test, which is now considered to be almost only of antiquarian value, must seriously detract from the value of this work. The second chapter is devoted, according to the table of contents, to the Anatomy of the Auricle, and consists of 55 pages, whilst the next, dealing with malformations and diseases of the auricle, has 23. In the volume before us, pages 49 to 64 inclusive are represented by blank sheets of paper, consequently the reviewer is somewhat at a disadvantage in forming an opinion on the subject matter of them. The book deals with certain subjects at a most inordinate length, while its general style is what one might term colloquial, and would give one the impression of its being a compilation of clinical lectures to Post-Graduate Students. In chronic non-suppurative disease of the middle-ear, one cannot find even an acknowledgment of the existence of that most intractable, but withal important ailment, the so-called otosclerosis, while of differential diagnoses in the various forms of middle-ear disease practically nothing is said.

The Anæsthetic Technique for Operations on the Nose and Throat. By A. de Prendeville, Senior Anæsthetist at the London Throat Hospital. London: Henry J. Glaisher.

"Out of the chaos of the past we have evolved the order of the present, and perchance the future holds but few mysteries yet to be solved." Without anæsthesia "all progress that has marked the path of surgery during the last 70 years would have been unrecorded. Conservatism and the wondrous measures of relief, that spring from it, would yet have been as far removed from us as are the Greek kalends, and now, instead of basking in the sunshine of hope, we would be still struggling in the meshes of despair." These are brave words, and, in the language of the mid-Victorian poet, are "all very fine and large," but one scarcely expects to meet with tall writing of this description in a brochure of 79 pages. Even a quotation from Browning embellishes the chapter on "anæsthetic technique for operations in the upright position."

Still, the writer's matter is better than his manner, and we quite sympathise with him in his efforts to show the dangers and disadvantages of anæsthesia in nose and throat cases, and the way in which they should be overcome and avoided. There are no cases in surgery which call more urgently, not only for a skilled anæsthetist, but also for one who has had special training in this particular line of work. Dr. de Prendeville's small book will do good service in calling attention to the subject, and many of his suggestions and directions will prove most helpful.

A Guide to the Administration of Ethyl Chloride. By G. A. H. Barton, M.D., Anæsthetist to the North-West London Hospital, Throat Hospital (Golden Square), and Female Lock Hospital, etc. Pp. 36. 1 illustration. London: H. K. Lewis.

This small book embodies the result of a fairly large experience of this new anæsthetic, and tells its story clearly and without bias, for the author recognises the many merits of this powerful drug, but, at the same time, is

careful to point out the drawbacks to its use. The impression, gathered from a perusal of the work and from other communications on the subject, is to the effect that ethyl chloride must remain a special method in the hands of the trained anæsthetist, as it is not altogether suitable for those who must necessarily remain unpractised, owing to infrequent opportunity of administration. For the latter, gas, and gas and ether, will most probably still provide the firm ground of trustworthiness. For those who wish to have a sound and practical guide in the use of the new anæsthetic, this book can be most cordially recommended.

The Pathology of the Eye. By J. Herbert Parsons, B.S., D.Sc. (Lond.), F.R.C.S., Eng., Assistant Ophthalmic Surgeon, University College Hospital; Assistant Surgeon, Royal London Moorfields Ophthalmic Hospital; Ophthalmic Surgeon, Hospital for Sick Children, Great Ormond Street. Vol. II. Histology.—Part II. Pp. 381. 279 illustrations. London: Hodder and Stoughton. 15s. net.

This book is a continuation of Volume I., and deals very fully with the normal and morbid histology of the lens, the choroid, the retina, the optic nerve, the orbit and the lachrymal apparatus. Dr. Parsons is to be congratulated upon the excellence of this work. Much has been said in praise of the first volume, and we can confidently say that the present volume is quite up to the standard of the former. The whole work is certainly the standard English work upon the Pathology of the Eye, and no scientific ophthalmologist can afford to be without this excellent reference book. The diagrams are all very good, many of which we observe are usefully repeated in different portions of the book. Much time and care must have been bestowed upon their preparation. We consider that one of the main features of the work is the large number of references to all the more important papers and transactions in ophthalmology in the English, German and French languages, and these are appropriately placed at the end of each section to which they refer.

The Changes produced by Inflammation in the Conjunctiva. By M. S. Mayou, F.R.C.S., Jacksonian Prizeman and Hunterian Professor, Royal College of Surgeons, England. Pp. 179. Figures 44. London: John Bale, Sons and Danielsson, Ltd. 10s. 6d. net.

This book consists of the substance of the three lectures delivered by Mr. Mayou at the Royal College of Surgeons in 1905, the year in which he was Hunterian professor. These admirable lectures are a record of the results of the author's three years of very laborious and painstaking work upon the microscopical changes which occur in inflammation of the conjunctiva and the subjacent cornea. In them he sets forth, and describes in detail, pathological conditions which he has observed, and in many cases suggests reasons for these changes. In recognition of this excellent work Mr. Mayou was awarded the Jacksonian Prize in 1903. The figures and diagrams with which the book is illustrated are all well reproduced.

Notes by the Way.

The State and Scientific Research.

In his Presidential Address to the British Association, Professor Ray Lankester, after referring to recent discoveries as to the causation of malaria, sleeping-sickness, and other diseases, went on to make a vigorous appeal for a fuller recognition on the part of the State of its duty in regard to the furtherance of scientific research directed to the prevention of such scourges. "If," he said, "the people of Britain wish to make an end of infective and other diseases, they must take every possible means to discover capable investigators, and employ them for this purpose." The way to do this, we gather, is to spend a thousand pounds of public money where we now spend one. It would, we are told, be reasonable and wise to expend ten million pounds a year of our revenues on the investigation and attempt to destroy disease. What we actually spend in this way, however, is a mere nothing—a few pounds a year, and, in consequence, "our people are dying by thousands of preventible disease." The policy of *laisser faire*, adopted by successive Governments in regard to this matter is attributed to the fact that political administrators and permanent officials are not sufficiently educated to appreciate the practical importance of science. In contrast to the indifference of the Government, Professor Ray Lankester points to the large sums of money given for the advancement of scientific knowledge by wealthy members of the community. In the United States, he says, such gifts are not infrequent; among us they are rare. He mentions the endowment of the Lister Institute by Lord Iveagh as the largest gift ever made to science in this country, and he predicts that it will be productive of great benefit to humanity.

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Who is to Blame?

There is, unquestionably, much force in Professor Ray Lankester's contention. But we think he lays the blame on the wrong shoulders. The British Government for the time being reflects

the mental attitude of the majority which placed it in power. If money granted for purposes of scientific research is doled out with a niggardly hand by the keepers of the Public Purse, that is the fault of the British public itself. If they are dying by thousands of preventible disease, it is because they close their ears to the teachings of science. Every people, it has been said, has the government it deserves, and it is useless to blame public servants for carrying out the behests of their many-headed master, the Sovereign People. Parliament represents all the stupidities and prejudices of the British people. Among those prejudices, one of the most deeply rooted is a distrust of medical science and a dislike of its prophets. Hence, proposals to apply public money for the promotion of research even indirectly connected with medicine, are looked upon with suspicion, and generally met by active opposition. No Government cares to risk defeat for what most politicians regard as a matter of altogether secondary importance. Gladstone never could be got to take the slightest interest in questions relating to the prevention of disease, and although Lord Beaconsfield used *sanitas sanitatum omnia sanitas* as an electioneering cry, it is well known that he looked upon medical science with the contempt born of ignorance.

Political leaders of the present day are not more enlightened. Nor is it likely that they will take any pains to become so until the growth of interest among the people in the problems of prevention of disease makes it worth their while to do so.

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The Limitations of State Aid.

WHILE fully agreeing with Professor Ray Lankester that more money is needed for the successful prosecution of the scientific warfare against disease, we think it not amiss to point out that a good deal more than money is needed. The President of the British Association appears to think that the expenditure of ten millions a year is all that is necessary to bring about a hygienic millennium in which disease shall no longer walk up and down upon the earth seeking whom it may devour. This expenditure will, he seems to think, enable us to discover

capable investigators and employ them to make an end of infective and other diseases. We venture to think that the problem is not quite so simple. Money can build laboratories equipped with all the apparatus needed for the most delicate researches; it can provide in the largest abundance the material and the machinery for work, and it can make smooth the path of the worker. But it cannot create him. Professor Ray Lankester speaks with natural and legitimate approval of the vast sums given by American millionaires for the encouragement of research. But can he point to any fruits of those benefactions so far obtained that can be considered at all proportionate to their magnitude? Again, he speaks of the Lister Institute. Is he prepared to say that the work hitherto done there, useful as it is, has fulfilled the hopes created by Lord Iveagh's princely gift?

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The Failure of Endowed Research.

We are inclined to think that the endowment of research, unless it is strictly limited, makes not for progress but for stagnation. There is a great deal of human nature even in scientific man, and, as a general rule, he works best when his livelihood depends on his putting forth all his energies. The endowment of research is mostly the endowment of the superior person, who, as he grows older, almost inevitably becomes fossilized and obstructive. To too many of the high priests of science may be applied what was said of church dignitaries:—

In the days of gold
The days of old,
Crozier of wood
And bishop of gold!
Now we have changed
That law so good,
To crozier of gold
And bishop of wood.

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Our Defence against Disease.

Dr. Maudsley has expressed the belief that we shall never be able to keep pathogenic organisms out of the body. Not having the gift of prophecy, we cannot speak with such

confidence on the subject. It seems to us, however, that something has already been done towards this end. The marvellous achievements of antiseptic and aseptic surgery bear striking witness to the success with which certain kinds of disease-producing organisms are kept out of the body. This result is of a nature to encourage us to strenuous efforts in other directions. The total elimination of pathogenic microbes from the universal frame of things may well seem a hopeless task. Only the merest infinitesimal fraction of them have been identified, and we cannot effectively protect ourselves against the unknown. In our helplessness we may find comfort in the teaching of Metchnikoff that we have within us the machinery of our defence. Professor Ray Lankester, in his address, gave an account of the researches of the Russian investigator, which doubtless find special favour in his eyes because they are the work of one who is not a doctor but a zoologist. Metchnikoff's work for the last twenty years, he said, has mainly consisted in demonstrating that the "phagocytes," or eater-cells, are the chief, and probably the only, agents at work in either ridding the human body of an attack of disease-causing germs, or in warding off even the commencement of an attack, so that the man or animal, in which they are fully efficient, is "immune"—that is to say, cannot be effectively attacked by disease germs. The obvious moral is that our natural defensive forces should be kept in the highest state of efficiency. But how is this to be done? Here, unluckily, the Master becomes rather vague. All he has to tell us is that alcohol, opium, and even quinine hinder the phagocytic action whereas the injection of blood-serum causes an increase in the number and activity of our physiological police. This, of course, is something, but it does not carry us far on the way towards the wished-for consummation of making an end of infective and other diseases. Persons of a fearful disposition may find comfort in that "blessed word" phagocytosis; but even those who accept Metchnikoff's doctrine with the fullest faith can scarcely shut their eyes to the fact that his phagocytes, like policemen, often fail us when their help is most urgently needed.

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The Phagocyte as our Enemy.

In his enthusiasm for the phagocyte as our natural protector, Professor Ray Lankester overlooked another part of Metchnikoff's doctrine. According to his later revelation, the phagocyte is but a treacherous ally. If it gives a certain amount of protection—and that not always efficient—against infective diseases, in the later period of life it becomes our active enemy. It would almost seem as though it preserved us to be a choice food for it when our tissues are in a fit condition to be eaten. Metchnikoff holds that the phagocyte is a prominent factor in the production of senile decay, by devouring the normal tissues, which are then replaced by connective tissue. "Senile decay," according to him, "is mainly due to the destruction of the higher elements of the organism by phagocytes." He adds that "in old age a struggle takes place between the higher elements and the phagocytes, the end being usually a weakening in the vitality of the former, while the activity of the latter is enormously increased; so our means of fighting against old age is to strengthen the higher elements of the organism and to weaken the aggressive capacities of the phagocytes." And how is this to be done? Why, by means of another serum, which will strengthen the tissue elements. It is suggested, to all appearance quite seriously, that a serum for the purpose can be got from a horse into which minced human brain, liver, kidney, etc. has been injected. If it is asked where these substances are to be procured in a sufficiently fresh state, the answer appears to be contained in a hint that *post mortem* examinations should be made immediately after death! There is a savour of cannibalism in this method of prophylaxis which, even if we believed it likely to be effective, would incline us to take our chance against the most aggressive phagocytes. Subtle and pregnant with suggestion as Metchnikoff's work is, we cannot help saying that to our minds much of it is too speculative and visionary to be really useful. The lack of a clinical knowledge of disease betrays itself in the habit of reasoning from data largely hypothetical, and ignoring all practical difficulties. With all respect for Professor Ray Lankester's judgment we venture to say that this defect to a certain extent vitiates the work of the zoologists, botanists

and naturalists, to whom, nevertheless, pathology is under large obligations.

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School Games.

In these days when the prominence of games in English schools is deplored by so many of those interested in education, some courage is needed to come forth in defence of them. The friends of what are called manly sports may well rejoice at having secured so powerful an ally as the Regius Professor of Physic in the University of Cambridge. In giving away the prizes at the Leeds Grammar School recently, Professor Clifford Allbutt spoke his mind on the subject with no uncertain sound. There was nothing new in his argument. He holds that school games have an educational influence of special value in the training of character. But to be useful in this way, he holds that the games must have in them an element of danger to the players. The Professor does not think that games are of any use whatever, at which a player cannot hurt himself and others. The damage must, of course, be done, not wilfully but accidentally. He sees his ideal of games in cricket and football, and he allows boating a place in his educational scheme, presumably because there is always a chance of an unskilful oarsman drowning himself or other people. Professor Allbutt says, "that manly sports teach a man courage"; does he really believe that courage can be "taught"? And, we may further ask, is "courage" of the kind that goes to the making, say, of a football player, a quality of any particular value in life, except perhaps in enabling a man to push his way through a crowd?

It is well known that football as it is played in American colleges, where courage is really required, is simply a degrading form of fighting in which brutal violence and low cunning are mingled in an unlovely compound. Against cricket there is little to be said, though even in our great national game, bowlers have been known to try to maim a batsman who could not otherwise be got rid of. We fail to understand why Professor Clifford Allbutt's feelings are ruffled by seeing undergraduates playing lawn tennis. It is a game which calls all the player's muscles into healthy action, and the Professor should be soothed by the ever present possibility

of a hard return bursting the eye of one of the other side. He says there ought to be a law against any man playing golf before he is thirty-five. We should be sorry to see cricket killed by golf, as pessimists foretell will be its fate, but we submit that even for young men golf has a distinct value, not merely as a physical exercise—and on a sporting course this is by no means inconsiderable—but as a discipline in self-restraint and a training in the accurate adjustment of means to end. *Amicus Plato sed magis amica veritas;* and truth compels us to say that we do not think the Professor has made out his case. The real point is not what games are best, but whether too much time is not given to games at most schools. We are said to take our pleasures sadly, and we certainly take our games too seriously. The foolish saying attributed to Wellington that the battle of Waterloo was won on the Eton playing fields is now said to be a myth. It would be scarcely too much to say that our defeats and mishaps in South Africa were in large measure due to the fact that our officers had been bred up to regard excellence in manly games as the chief end of a gentleman's existence.

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Rabelais as a Physician.

THE literary fame of the creator of Pantagruel has caused the fact that he was a physician to be almost forgotten. Yet by contemporaries he was acknowledged to be one of the foremost physicians of his day, and he not only wrote learned commentaries on Hippocrates, but lectured on medicine at Montpellier. He gave public demonstrations on the dead body when Andreas Vesalius, a lad of twenty, was "resurrecting" bodies in the cemeteries of Paris; and Professor Le Double of Tours has shown that his anatomical comparisons, grotesque as they seem to a modern reader, are striking in their aptness when the things, to which the various organs of the body are compared, are looked at as Rabelais saw them. He practised his profession not only as the adviser of cardinals and bishops, but as a hospital physician at Lyons. He took up his abode in that city in 1532. There he dwelt for many years, compiling almanacs, cultivating the friendship of such men as Clement Marot, the poet; Etienne

Dolet, the learned printer, who celebrated his friend's anatomical lore in Latin verse, and who ended his days at the stake which Rabelais himself managed by good fortune and powerful influence to escape; Jean Grollier, a noted bibliophile, and many others. There he produced the first part of the work which has given him a place among the immortals. There, too, he practised the art of healing. A Lyons professor, M. Alexis Bertrand, has unearthed some records of his professional career which may be found in a recently published book entitled *Mes Vieux Médecins*. In the accounts of the Hôtel Dieu Hospital for 1532 is found an entry of a payment made to to "the physician of the said hospital" of his salary for three months at the rate of forty livres a year. In a marginal note it is stated that the name of the physician then recently appointed was "M. François Rabellet." The salary, which M. Bertrand estimates as equivalent to about 900 francs, or £36 of our money, was paltry, but the physician got free board and lodging besides. Moreover, private practice was allowed. The office, therefore, was comfortable enough, but Rabelais did not hold it long. On Sunday, February 13, 1534, the board of management met to consider the repeated and prolonged absence from duty of their physician. It was proposed to dismiss him, and there were three candidates for the vacant post, each eager to undersell the others. That is a feature of professional life, of which examples might still be found even in these days when the ethical teacher is so much abroad. The discussion is just the sort of thing we are accustomed to in modern committees. Managers evidently thought more of economy than of professional qualification. They were anxious not to offend a liberal subscriber, who clearly did not look upon Rabelais with a favourable eye. The absentee physician had indeed some friends on the board, but they did not back him very strenuously. One suggested that further consideration of the matter was necessary, another proposed that nothing should be done till Easter as he had heard that Rabelais was at Grenoble, and he might return. No decision was arrived at, but, at a subsequent meeting on March 5, his dismissal was resolved upon by a unanimous vote. Why did Rabelais leave Lyons? The point remains undecided. Some attribute his departure to what a famous

actress called *un accident de l'amour*, to wit, a son. It is certain that Rabelais had a son named Théodule, who died at the age of two years. But this was no secret at the time, for the child's death was mourned by various friends in verses that are still extant. It has been suggested that Rabelais's flight from Lyons was due to an unheroic fear of the plague. Such cowardliness was unfortunately common in his time and long after. Probably, however, it was the dread of the unpleasant consequences of a charge of heresy that led him to seek safety in some safer place than Lyons.

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Competitions.

THE results of the July Competitions are as follows:—The best essay was sent by Dr. G. S. Haynes, of Cambridge; and the three best cases by Dr. D. L. Davies, of Wisbech. Cheques have accordingly been sent to these gentlemen, and the prize essay and the winning cases will be published in due course.

Practical Notes.

The Olfactory Mucous Membrane.—The olfactory region of the nose includes the mucous membrane upon the upper and middle turbinated bones and the upper third of the septum nasi. This region is covered with a vascular, yellowish mucous membrane, which consists of two portions, viz.: The epithelium, which occurs on the free surface, and the deeper corium. The former is composed of two different kinds of cells. There are the *olfactory cells*, which are long, narrow, and spindle-shaped, the free ends of which are ciliated, while the proximal ends are somewhat varicose, and around this varicose end the olfactory nerve-fibrils, which come from the olfactory bulb, arborise. The other variety of cells is known as the *sustentacular* cells; these are elongated columnar cells, the free border of which is blunt, and the proximal border somewhat forked; there are no nerve-fibrils connected with these cells, and they are considered to be supporting cells for the sensory nerve epithelial cells, or olfactory cells proper. The corium of the olfactory mucous membrane is very thick, and contains many blood vessels, bundles of non-medullated olfactory nerve-fibres, also a large number of well-defined glands, like serous glands in structure, which are known as *Bowman's glands*. These glands are connected with fine ducts, which open on to the free surface of the olfactory mucous membrane, passing between the epithelial cells.

The function of the mucous membrane of the nasal fossæ is to moisten and warm the inspired air. At the same time the hairs at the vestibule of the nose and the mucous membrane also help to cleanse the air before it reaches the lungs. The olfactory mucous membrane in the upper part of the nasal cavities is obviously the organ of smell.

Hay Fever or Autumnal Catarrh.—This may be looked upon as a vaso-motor neurosis and, in recent years, it has been especially pointed out that persons, who suffer

from this condition, are of a neurotic constitution, and may, from time to time, suffer from attacks of spasmodic bronchial asthma, especially following soon after the onset of their nasal symptoms. Bosworth, in his work entitled *Diseases of Nose and Naso-Pharynx*, points out that hay fever and asthma are dependent upon three main conditions, viz :—(1) A general neurotic condition ; (2) a diseased condition of the nasal mucous membrane ; (3) some obscure condition of the atmosphere exciting the paroxysms. He also points out that the connection between certain nasal diseases and asthma is very intimate, and that a sufficient cause for an attack of asthma may be found in the nose in most, if not all, cases ; at any rate, it is well to keep in mind that all patients, who suffer from spasmodic asthma, should have their nasal cavities very carefully examined in order to ascertain whether there is a possible nasal cause for the attack.

It has been found that, in this country at any rate, one of the most powerfully-exciting causes of hay-fever is the pollen of certain grasses, more especially of that known as the *anthoxanthum odoratum*. It must, however, be remembered that there may be other sources of irritation, such as the perfume from certain plants, the odour of certain animals, and dust, and that any of these may bring on an attack in individuals predisposed to the disease. Hay-fever is more prevalent in dry and hot weather than in wet weather. Many morbid conditions have been discovered in the nose of those persons who suffer from the disease. Amongst these may be mentioned a state of hyperæsthesia, increased vascularity of the nasal mucous membrane, especially over the inferior turbinated bones ; this is due to a vaso-motor paralysis, and is associated with a profuse watery discharge from the nose, also hypertrophic rhinitis, polypi, deflections of the nasal septum, and a nasal spur. The chief symptoms of hay-fever are usually the following :—Conjunctival injection with lachrymation and photophobia, with a sense of fulness and oppression in the head, with pain over the position of the frontal sinuses. The nose feels very uncomfortable, breathing through it becomes difficult, there is a profuse watery discharge from it, and persistent sneezing occurs. The catarrhal condition sometimes extends along the Eus-

tachian tubes to the middle ear, and produces slight middle-ear catarrh with accompanying deafness; the inflammatory condition occasionally extends down to the fauces, causing a feeling of dryness and irritation. The catarrhal inflammation may also extend down the trachea to the bronchi, causing a sense of constriction of the chest and cough; bronchial asthma may occasionally accompany the attacks. In considering the rational treatment of hay-fever, it is obvious that the patient must, if possible, be removed from the exciting cause of the paroxysm, and the conjunctival sacs and the nostrils must be bathed out with a solution of corrosive sublimate, 1 in 6,000. Plugging the nostrils with tampons of cotton-wool soaked with glycerine is very useful in some cases (de Havilland Hall). The nasal passages must be very carefully examined in order to discover, if possible, any abnormal condition there, which may be a local predisposing cause to the complaint. Good results have followed the local application to the nasal mucous membrane of a solution of 10 per cent. menthol, dissolved in almond oil or paroleine. Sir Andrew Clark overcame the irritability of the mucous membrane of the nose by swabbing out the interior of the nostrils with the following solution:—Glycerine of carbolic acid, one ounce; hydrochloride of quinine, one drachm; perchloride of mercury, one two-thousandth part: the whole made into a solution by heating.

Lennox Brown recommends the local application of the following ointment to the interior of the nose:—

℞ Liquoris Atropinæ Sulphatis - - ʒi.
Olei Eucalypti - - - ʒi.
Vaselin. - - - ad ʒi.
Misce. Ft. Ung.

Or, the solution of atropine may be omitted from the above.

Should asthmatic attacks occur in the course of hay-fever F. de Havilland Hall recommends the following:—

℞ Potassii Iodidi - - - gr. v.
Spiritus Ammoniæ Aromatici - - ɱxx.
Tincturæ Gentianæ Co. - - - ɱxx.
Aq. - - - ad ʒi.
Misce. Ft. Mist.

Or,

℞ Liquoris Trinitrini - - - ♏ss.
Spiritus Ætheris Nitrosi - - ♏xx.
Tincturæ Chloroformi Co. - - ♏x.
Aq. - - - - ad ℥j.
Misce. Ft. Mist.

This mixture may be taken every hour for three doses; or, the inhalation of the fumes of the compound lobelia powder:—

℞ Pulveris Lobeliæ - -
Pulveris Stramonii - - } ãã pt. æquales.
Pulveris Theæ - - -
Potassii Nitratis - -
Misce. Ft. Pulv.

At the same time, it is extremely important, if possible, to endeavour to improve the general tone of the patient's nervous system, and with this in view, such drugs as the following may be employed: arsenic, iron, phosphorus, and strychnine. The following mixture occasionally proves to be very useful:—

℞ Potassii Bromidi - - - gr. xv.
Liquoris Arsenicalis - - - ♏iij.
Tincturæ Gentianæ Co. - - ♏xxx.
Aq. - - - - ad ℥i.
Misce. Ft. Mist.

Infantile Diarrhœa.—As is well known, children are very liable to suffer from diarrhœa during the late summer and early autumn months, and in many cases it appears almost as an epidemic, especially in cities and large towns. The intestinal lesion is practically a superficial catarrhal inflammation involving the mucous membrane of the stomach, small and large intestine, brought about by putrefactive changes, which are liable, at the above-mentioned period of the year, to occur in the alimentary canal. Absorption of toxic substances then takes place, and this produces severe symptoms of collapse. If the infection is severe, and the symptoms persist, gross lesions occur in the lower portion of the ileum and in the colon. With regard to the cause of summer

diarrhœa in children, a number of factors have to be considered: (i) errors in diet which are liable to cause acute dyspepsia; (ii) certain predisposing causes, such as irregularity in the feeding of children, bad hygienic surroundings, delicate children with low resisting powers, tender age; (iii) hot weather. How hot weather influences the diarrhœa, it is difficult to explain, but there is no doubt that the constitutional depression, which is produced by a persistently high atmospheric temperature, does certainly interfere with digestion, and acute dyspepsia does no doubt prepare the way for local intestinal infection. Many physicians believe that these attacks of summer diarrhœa are of an infectious nature, although, at the present time, no one form of bacteria can be assigned as the cause of this type of the disease. Although the Shiga bacillus may produce diarrhœa of this variety, "with existing knowledge, it seems probable that there is a number of organisms present in the intestines in slight disorders of digestion, which, under favourable conditions, may multiply to such a degree as to produce very serious disease" (Holt). It must be remembered that there are cases which suddenly develop in children, who appear to have been previously in perfect health. The milk, upon which they are fed, has been properly sterilized in order to destroy any micro-organisms, which may be present in it, but such sterilization does not necessarily destroy the toxins, the products of bacteria, which may be in the milk.

The treatment of summer diarrhœa in infants may be considered under the two headings: (i) prophylactic and (ii) curative.

Holt says that prophylaxis demands, 1. The sending of the infants and young children out of the towns and cities to the country and seaside during the later summer months; 2. The education of the laity as to the importance of proper rules of feeding, the dangers of overfeeding, and as to what constitutes a suitable diet for infants who have just been weaned; 3. Proper legal regulations regarding the transportation and sale of milk; 4. Sterilization of milk used by the poor during the summer; 5. Scrupulous cleanliness of bottles, spoons, nipples, soothers and teething rings; 6. Prompt attention to all mild derangements; 7. Reduction in the amount of food and increase

in the amount of water given during the days of excessive summer heat. At the same time, it is well to insist that, for those children who are bottle-fed, the milk must be bought fresh at least twice a day. It should be sterilized at once, covered in order to prevent dust and flies from getting into it, and it should be kept in a cool, light place. The vessel, in which the sterilised milk is, may be conveniently placed in a large basin containing cold water. Breast-fed babies should not be weaned during the hot weather.

In treating a case of infantile diarrhœa, the first thing to be done is to rectify bad hygienic surroundings; town children should, if possible, be sent to the country, if that is impossible their living rooms should be light and airy. The child's diet must be carefully restricted. Digestion is deranged, as little food as possible must on that account be given, or for a few hours food may be altogether withheld. Thirst should be relieved by bland fluids, frequently given, but in small quantities, and always cold. Water may be freely allowed, unless there is much vomiting. Sterilized cow's milk, but diluted, may be given in very small quantities; the effect of this upon the child's temperature and stools must be carefully watched. Barley water, albumen water, whey, veal and chicken broth are useful substitutes for milk, but these must be always given in very small quantities. This must be insisted upon, for parents are liable to think that the child is being starved, and will give the little patient very much more food than it can possibly digest.

If vomiting persists, it is a good plan to administer copious draughts of cold water, previously boiled. This is readily taken, and may be almost immediately vomited: this cleanses the stomach and is a fair substitute for washing it out. The contents of the small intestine should then be thoroughly cleared out by the administration of castor oil, calomel, or salines. Two drachms of castor oil may be given to a child, one year old; this dose may be increased in older children. The oil clears out the whole of the alimentary canal, and causes very little, if any, griping, while its after effects are soothing. If the stomach is in a state of irritation, the castor oil is liable to increase the vomiting. In such a case, calomel may be given in $\frac{1}{4}$ grain doses, every hour, up to six doses, or until the usual greenish stools are seen.

Of the saline purges, the following may be used:—Tartarated soda, magnesium sulphate, magnesium citrate. The following may be found useful:—

℞ Magnesii Carbonatis - - - gr. iij.
Magnesii Sulphatis - - - - gr. x.
Spiritus Chloroformi - - - ♏ iij.
Aq. Menth. Piperit. - - ad ʒj.
Misce. Ft. Mist.

One teaspoonful to be taken every three hours.

℞ Tincturæ Rhei - - - ♏ vij.
Magnesii Sulphatis - - - - gr. vj.
Syrupi Zingiberis - - - ♏ v.
Aq. Carui - - - ad ʒi.
Misce. Ft. Mist.

One teaspoonful to be taken every three or four hours.

Whenever fresh signs, or symptoms, of intoxication arise, such as may be indicated by a rise of temperature and a rapid pulse with great prostration, the cathartic treatment suggested above should be repeated. Holt says that irrigation of the colon is advisable in all cases, since it hastens the effect of the cathartic, and also at once removes much irritating and offensive material which may be in the lower bowel. A long rectal tube should be used and a saline solution (one teaspoonful of sodium chloride to two quarts of water at a temperature of about 100° F.) should be injected into the bowel; this may be done two or three times on the first day, and afterwards once daily if necessary.

Intestinal antiseptics may be tried later in the disease, although they are of a secondary importance. Bismuth subnitrate, in 10 grain doses, suspended in mucilage, may be given to a child three times a day. Benefit will be occasionally derived from small doses of sodium salicylate, which may be given, dissolved in water in doses of 2 grains, every two or three hours after food. It sometimes causes vomiting, and, in such circumstances, must be stopped. Holt advises that it should be given alone, and its best effect is seen when all tendency to vomit has ceased. Salol, in 1 or 2 grain doses, may be given every two or three hours; in a similar way, resorcin may be tried in 1 grain doses every two or three hours, but both salol and resorcin are liable to irritate the child's stomach, and to start the vomiting afresh.

If the case is severe, stimulants may be required, the best, no doubt, is good brandy. A child, a year old, may take half-an-ounce of brandy in 24 hours, the brandy should always be very fully diluted with water, say 8 or 10 parts of water, and must be given in small quantities at short intervals. If the stomach is in a state of irritation, champagne is preferable for older children, and must similarly be administered in quite small quantities. In some cases, in which extreme prostration comes on, the patient should be put into a hot bath. The drain of fluid by the bowel is sometimes very great, and this too increases the prostration of the child. In these circumstances, it is advisable to inject a ·9 per cent. sodium chloride solution into the loose cellular tissue of the anterior abdominal wall, back, thighs, or gluteal region. At least half-a-pint should be used, but preferably more during 12 hours. The salt solution should be slowly injected, or allowed to flow gradually into the connective tissue. The amount administered should always be carefully measured; as a rule, there are no signs of irritation, and the fluid is very rapidly absorbed.

Bathing and the Ear.—Bathing, especially sea-bathing, is not an uncommon cause of acute diffuse inflammation of the external auditory meatus. The cold salt water gets down the meatus and sets up there the inflammatory process, which may extend to the membrana tympani. There is swelling of the skin lining the meatus, throbbing pain, a sense of fulness and occasional tinnitus, followed by a serous discharge. The pain is increased by pressure over the tragus, and by the movements of the lower jaw. Counter-irritation should be applied behind the ear over the mastoid process, hot fomentations over the auricle, and the following injection, as recommended by Urban Pritchard, used :—

℞. Liq. Plumb.
Liq. Morph. - - - ad ℥ss.
Aq. - - - - - ℥x.
Ft. injectio.

One tablespoonful to a wineglass of warm water will be serviceable for relieving pain.

Novelties and Notices.

ARTOX FOOD.

(Messrs. John Dunbar & Co., 240, Goldhawk Road, London, W.)

This food is specially prepared from the Entire Wheat Berry, and is free from chemicals or preservatives. When used in accordance with the recipes given, it makes a palatable and useful food for infants and invalids, indeed for all who suffer from weak stomachs. By its use indigestion and constipation are prevented.

ROBINSON'S PATENT BARLEY AND PATENT GROATS.

(Messrs. Keen, Robinson and Co., Ltd., London.)

Patent Barley.—Experience has shown us that this well known barley is invaluable for the preparation of barley water and infants' food. Many persons find barley water a nutritious and refreshing drink, and an excellent substitute for alcoholic beverages. To these, as well as to invalids, Robinson's Patent Barley can be strongly recommended. It contains 84 per cent. of carbohydrates, 4·37 per cent. of albuminoids and about 1 per cent. of fatty matters, and is consequently highly recommended for mixing with cow's milk for the food of infants who are not breast-fed. Its use with cow's milk goes far to assimilate that to human milk, since it prevents the clotting of the curds and thus renders the milk from the cow more digestible.

Patent Groats.—For the preparation of gruel for mothers and invalids, and for the making of porridge for children, young and old, the use of these groats cannot be too strongly recommended. They contain nearly 76 per cent. of carbohydrates, 7 per cent. of albuminoids and 8·18 per cent. of fatty matters, and are eminently useful for adding to cow's milk for young children who have grown out of the milk stage.

PAUTAUBERGE'S SOLUTION (HYDROCHLORO-PHOSPHATE OF LIME AND CREOSOTE).

(Messrs. Wilcox, Jozeau & Co., Haymarket, London.)

The value of creosote in chronic pulmonary affections is now generally admitted, but the hindrance to its use hitherto has

been the difficulty of introducing it into the organism in sufficient quantities without setting up local irritation. This difficulty has been, to a large extent, overcome by M. Pautauberge's solution, which, when taken with food, never causes gastric intolerance, and is promptly absorbed. The solution contains about two minims of creosote in each tablespoonful, and owing to its having been redistilled and dissolved in a fluid, capable of being diluted with water in any proportion, the creosote has no caustic or irritating action on the gastric mucosa, on which it exerts a marked antiseptic action. The solution is indicated in all forms of tuberculosis, chronic broncho-pulmonary affections, convalescence after pleurisy, broncho-pneumonia, influenza, measles, whooping cough, and in diabetes, scrofula, and rickets.

A tablespoonful represents 1¾ minims of pure beechwood creosote and about 8 grains of Chloro-phosphate of lime, and should be taken in half a glassful of sweetened water just before, or after a meal.

We are asked to state that the winner of the International Shorthand Speed Competition at Baltimore, U.S.A., was Mr. Sidney H. Godfrey, who achieved the remarkable record of 250 words per minute. Of his achievement he writes: "The pen used by me was a 'Swan' fountain pen purchased six years ago, and which had been in constant use ever since. It has never failed me, even when writing at the rate of 250 words per minute. This is another remarkable testimony to the qualities of the 'Swan' pen, which is one of the best investments our readers can make. Fully illustrated catalogue can be obtained by mentioning THE PRACTITIONER to Messrs. Mabie, Todd, and Bard, 79–80, High Holborn, London, W.C.

COMPETITIONS.

We offer our readers every month two Prizes on the conditions stated below.

A Prize of Two Guineas will be given to the author of the best Essay on a subject to be announced by the Editor.

A Prize of One Guinea will be given to the author who submits the best account of three cases, medical, surgical, or obstetrical, taken from the practitioner's own note-book. The style of the account, as well as the medical interest of the cases, will be taken into consideration.

The results of the August Competitions will be announced in the October number.

The Subject of the Essay for September will be

The Diagnosis and Treatment of Renal Colic.

GENERAL CONDITIONS.

A.—All MSS. relating to the Essay must be marked on the top left-hand corner "Essay," and must be sent to the Editor of THE PRACTITIONER, 149, Strand, W.C., on or before the 1st day of October 1906.

B.—All MSS. relating to the cases must be marked on the top left-hand corner "Cases," and must be sent to the Editor on or before the 1st day of October 1906. The matter submitted must not exceed three hundred words for any one case

C.—No Essay will be returned unless a special request is made, accompanied by a stamped addressed envelope.

A and B.—(1) One side of the paper only must be written on.

(2) The name or pseudonym, and address of the competitor must be clearly written on each sheet of paper used.

(3) The decision of the Editor is final.

(4) Competitors must be registered General Practitioners.

(5) The attached Coupon must be filled up by each competitor.

THE PRACTITIONER.

OCTOBER, 1906.

ABDOMINAL PAIN IN DISEASES OF THE PELVIC ORGANS.

By ARCHIBALD DONALD, M.A., M.D., C.M.,

Gynæcological Surgeon, Royal Infirmary, Manchester; Surgeon to St. Mary's Hospital, Manchester; and

J. DUNLOP LICKLEY, M.D.,

House Surgeon, St. Mary's Hospitals, Manchester; late Senior Demonstrator of Anatomy in the University of Manchester.

PAIN, as a symptom in gynæcology, has not been studied very carefully, and most of the work on this subject has been done by the neurologist and the physician in the course of more general investigations rather than by the gynæcologist. The reason for this is not far to seek. The gynæcologist has not to rely upon pain as a symptom, to any very great extent, in arriving at a diagnosis, but is occupied for the most part with gross lesions which are easily ascertained by the usual methods of examination. In most cases, the uterus, tubes and ovaries can be palpated, on bimanual examination, with almost as much precision as if they were on the surface of the body. With this direct method, and with some assistance from the history, a diagnosis can generally be arrived at. Nevertheless, there are cases in which, owing to excessive tenderness, great thickness, or rigidity of the abdominal wall, there is some doubt as to the nature of the lesion, or even as to the organ affected. In these cases, we may get some help from a more exact location of pain and tenderness.

In the first place, I should like to offer some general considerations as to the more common kinds of pain of which patients complain in gynæcological practice. After this, Dr. Lickley, who has been working at this subject for some time, will give the result of his investigations, which deal, in a more exact manner, with the referred pains found in disease and inflammation of the pelvic organs.

GENERAL CONSIDERATIONS.

As regards pain in acute inflammation of the pelvic organs there is not much to be said. An acute inflammation of uterus,

tubes, or ovaries, is practically always accompanied by some degree of peritonitis, with general tenderness, and boarding of the abdominal muscles. Even in this kind of case, however, there are special points which are much more acutely tender, and as more than one organ is generally involved, there are usually several points of such maximum tenderness.

There is one condition of an acute nature, in which a characteristic pain has to be noted, and that is, when the pedicle of an ovarian cyst is suddenly twisted, and acute congestion of the tumour is produced. In such a case, there is always abdominal pain more or less acute, but the tenderness, on examination, is still more marked, and the most characteristic symptom of all is that the pain is greatly increased when the patient turns in bed from one side to the other. This, of course, is due to the fact that the tumour rolls over and drags on the twisted pedicle.

In the ordinary forms of ovarian tumour, pain is not commonly met with until the tumour reaches a large size. Even then it seems to be due rather to stretching of the abdominal wall than to anything else. This statement applies also to fibroid tumours of the uterus. In some cases of small ovarian or fibroid tumour, dysmenorrhœa is a prominent symptom, but the nature and causes of this vary in different cases. When the tumours are small and impacted in the pelvis, pain may be produced by direct pressure on the spinal nerves, but the pain due to this cause is, of course, felt in the back and legs, and not in the abdomen.

In dealing with chronic gynæcological ailments, we find that the most common pain is one which is situated in one or other iliac region. In the older text-books, it is common to find that greatest emphasis is placed upon backache. In my experience, this backache is most usually met with in cases, in which there has been acute pelvic peritonitis which has passed into the chronic stage, or in cases, in which there has been a deep laceration of the cervix involving the vaginal vault or the base of the broad ligament. As to the iliac pain, it has always seemed to me a misfortune that this became known in the early days of gynæcology as an "ovarian" pain. The diagnosis of a diseased ovary was often made solely from this pain, and removal of the ovary commonly practised for it. If an operation was performed,

and no gross lesion of the ovary was found, the organ was generally pronounced to be cirrhotic, or, if a small cyst was found, this was regarded as the origin of all the trouble. Even so late as the summer of 1904, when the so-called ovarian pain was made a subject for discussion at the annual Meeting of the British Medical Association, although there was much healthy scepticism as to the part which the ovaries played in the production of the pain, I think that the most common cause was almost entirely overlooked. There is no doubt a region, on either side of and below the umbilicus, in which pain is felt when the ovary is inflamed, or when it is subject to undue pressure. True inflammation of the ovary in a chronic form is, however, very rare, except when it is associated with pelvic peritonitis. I formed the opinion, some years ago, that iliac pain in a large majority of cases is due to uterine affections, and subsequent investigations have confirmed me in this view. The sensation does not always amount to real pain, it is more often a dragging, or feeling of weight, or mere discomfort. It is nearly always present in cases of retroversion with enlargement of the uterus, and in cases of heavy anteversion. It is not always constant, but is generally produced when the patient has been standing for some time. In some cases, it is only felt just before the onset of the menstrual period.

The differentiation of pains in one or other side of the abdomen below the umbilicus is not always easy, especially if the right side is affected, and it is not an uncommon thing to see cases, in which a floating kidney, the appendix, the right ovary, and, finally, the uterus have been regarded as sources of the trouble, and occasionally these organs have been operated on in turn. If a more careful and systematic study of referred pain will enable us to differentiate with certainty, a great deal will have been accomplished. At the same time, a careful attention to other points will, in most cases, prevent us from making a blunder. If a kidney is sufficiently loose to cause pain, it is generally quite easy to detect the organ by careful palpation, and the painful region will be found to be at a higher level and more to the back than in the other cases. In appendicitis, the pain is more severe and more persistent, and the attacks are

generally well marked. If the ovary is sufficiently diseased to cause abdominal pain, there ought to be no difficulty in palpating it, and in deciding that it is abnormal in some way, *i.e.*, enlarged, prolapsed, or adherent. When the iliac pain is caused by uterine trouble, the uterus will always be found on careful bimanual examination to be enlarged and either retroflexed or retroverted, or acutely anteflexed, or in a position of exaggerated anteversion. In cases of this sort, the pain is not necessarily confined to one side; it generally spreads almost to the middle line and in many cases is felt on both sides. When the patient complains of a dragging low down in both iliac regions, or in the hypogastric region, I am accustomed to look on this as an almost certain sign of uterine trouble.

The question remains to be discussed as to whether this uterine pain is purely mechanical, or whether it is a referred pain, or whether it is mixed in its nature. It is not by any means easy to decide this point. In most cases, in which the uterus is pathologically enlarged, the enlargement is due to some endometritis, or chronic metritis, so that both mechanical and irritative influences are present. In early pregnancy, if the uterus is extremely anteverted so that the fundus hangs down, iliac and hypogastric pains are common. It might be said that, in this case, we have an example of purely mechanical dragging. But, there is distension of the cavity of the uterus, so that the question is still complicated. On the purely mechanical theory, we should expect the feeling of uneasiness or pain to be felt chiefly in the region of the inguinal canal, as the weight of the uterus, when the fundus is displaced downwards, is largely transferred to the round ligaments. But Dr. Lickley's researches go to show that it is just in this region that points of maximum tenderness are found in inflammation of the body of the uterus.

Even the effects of treatment leave us in doubt. In cases of endometritis, where the iliac pain is a marked symptom, it is nearly always relieved or cured by curetting. But this may be due merely to the removal of an unhealthy endometrium, or it may result from the diminution in the size of the uterus which follows curetting.

The exact way, therefore, in which this pain is produced

has yet to be definitely proved, but that the characteristic symptom of most chronic uterine trouble is discomfort or pain in the iliac region will be clear to anyone who will investigate the question with an unbiassed mind.

THE REFERRED PAINS OF PELVIC DISEASE (BY DR. LICKLEY).

Since the publication of the paper by Ross[1] "On the Segmental Distribution of Sensory Disorders," careful investigations by Mackenzie and by Head have shown the great importance, for diagnostic purposes, of a proper appreciation of the exact localisation of any pain, and its reference to pathological conditions of the viscera. Greater accuracy has been added to investigations by Sherrington, Thorburn, Paterson, and others, who have provided exact details of the relationship of the distributed nerves to the body surface.

In Head's[2] paper certain areas on the trunk surface are defined as related to the female generative organs. The complete demonstration of these in every case is, however, too prolonged for ordinary routine work. We propose, therefore, to simplify, and, at the same time, to modify them somewhat.

Observations have been made on a long series of out-patients, as well as on in-patients, but the cases, specially chosen for demonstration, are those in which operation has enabled us to check the results, or in which the diagnosis was never doubtful. One must always be prepared to admit the personal equation in each of these observations, and to realise that the value of many of the observations must depend on the nervous condition of the patient. This latter source of fallacy is much more liable to come into evidence, when we accept the patient's statement as to the distribution of a pain, but the risk of error is considerably diminished, if we lay much more stress on the localisation of tenderness, particularly if we can confine the tenderness to a small area, more or less constant in different patients.

The following cases will serve to demonstrate the site of the tenderness on the anterior abdominal wall in some typical gynæcological conditions.

[1] *Brain*, 1888. [2] *Brain*, 1893.

Fig. 1.

Fig. 2.

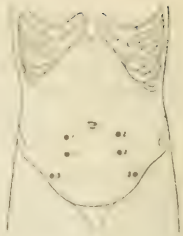

Fig. 3.

Fig. 1. *S. N., æt.* 58, *viii. para. Menopause at* 46. *Abdominal swelling of seven years' duration. Tumour practically median. No complaint of pain. Tenderness at point indicated.* Operation—*Large parovarian cyst in left broad ligament. Ovary cystic and papillomatous.*

Fig. 2. *S. E., single, æt.* 42. *Pain in right side of abdomen of six months' duration—exacerbations at irregular intervals. No gynæcological symptoms. Tenderness at points indicated numbered in order of degree.* Operation—*Left ovary prolapsed, shrivelled, capsule thickened. Left tube—hæmato-salpinx. Right ovarian cyst.*

Fig. 3. *K. H., æt.* 25, *ii. para. Pain in abdomen and back of over two years' duration—acute exacerbation of one month's duration. Irregular menstruation and menorrhagia. Profuse leucorrhœa. Tenderness as indicated.* Operation—*Left ovary cystic. Left tube distended, contained pus. Right ovary contained several blood cysts. Right tube thickened.*

A study of the foregoing cases would suggest that certain well-defined points can be recognised on the abdominal wall in relation to the female generative organs. Confirmatory evidence has been obtained from many other cases, and, for practical purposes, the following points may be defined. The uppermost of the points—the *ovarian*—lies slightly below the level of the umbilicus, and about 2 inches to one side of the mid-line. Speaking generally, this point lies on the intersection of a line joining the umbilicus to the anterior superior spine of the ilium with the outer border of the rectus sheath. The point varies in position within very narrow limits, but it is so definite that it can be covered with the end of an ordinary pencil.

A reference to the anatomy of the part will show that it lies practically over the point where the 11th dorsal nerve pierces the sheath of the rectus abdominis. At this point,

pressure can be brought to bear on the nerve where it is lying on a tough membrane, and where only fibrous tissue intervenes between it and the skin.

Similarly, the *tubal* point is to be found lower down on the outer margin of the sheath of the rectus, at the point where the 12th nerve pierces. It may be roughly marked out as the intersection of a horizontal line from the anterior superior spine of the ilium with the outer margin of the sheath of the rectus.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 4. *N. L., æt.* 24, *ii. para. Metrorrhagia of three weeks' duration following amenorrhœa of seven weeks.* Examination—*Incomplete abortion. Retroflexed uterus. On pushing up uterus tubo-ovarian swelling on right side.*

Fig. 5. *To show tender points. Ov=ovarian. O'v=accessory ovarian. T = tubal. U = uterine. U' = accessory uterine.*

Fig. 6. *A. B. First pregnancy (six months), admitted on account of fits, probably hysterical. No albuminuria—no pathological urinary deposit. Evidences of congenital syphilis. On the area marked out a band of comedones was found corresponding exactly to Head's 10th dorsal segment.*

The *uterine* point will be found to correspond to the site of the internal abdominal ring. Here the ilio-inguinal nerve enters the inguinal canal, and is easily exposed to pressure. In many cases, we can elicit a second point over the external abdominal ring, where the terminal filaments of the nerve are becoming cutaneous. A third point may occasionally be obtained by pressure on the anterior crural nerve immediately below Poupart's ligament.

In a few cases, it will be found that the points most tender to pressure are situated in the lateral line of the abdomen. Thus, in some ovarian conditions, a tender point can be found

a little higher than midway between the tubercle of the ilium and the costal margin (10th rib). This point corresponds closely to the point of exit of the lateral cutaneous branch of the 11th dorsal nerve.

In uterine conditions, again, we can sometimes elicit tenderness in the 1st lumbar nerve by pressure immediately opposite the anterior superior spine of the ilium.

In acute inflammatory conditions of the pelvic organs, the tenderness is not confined to points, but can be elicited along the whole line of a trunk segment; at the same time, however, the points can still be recognised as regions of maximum tenderness.

In several of the cases, in which a patient came complaining of "pain in the stomach," she could be got to localise the painful area to a part related closely to one of the tender points, or at least to the area of distribution of the corresponding nerve. In other cases, however, the patient either had very vague views as to the site of the pain, or did not complain at all of abdominal pain, although the points of tenderness could be easily elicited.

All the foregoing pains are in association with the anterior primary divisions of the spinal nerves, but the posterior primary divisions are also affected. It is interesting to note that *pain*, in the region of these latter branches, is the more common complaint of the patient, while *tenderness* in the anterior divisions is more easily elicited by the examiner.

Pain high up in the loin, about the level of the 12th dorsal spine, is but rarely complained of in ovarian conditions. The commonest sites of pain are over the iliac crests and over the sacrum. The first of these areas may frequently be traced from the outer margin of the erector spinæ, at the level of the 1st and 2nd lumbar spines, over the crest of the ilium to the gluteal region; only occasionally can tenderness be elicited over the iliac crest. This area follows the distribution of the posterior primary divisions of the first three lumbar nerves, and pain in this region is associated with pathological conditions of the body of the uterus.

Over the sacrum, tenderness can be frequently elicited, on account of the accessibility of the nerves to pressure. The area here is limited from the 2nd sacral vertebra to the

coccyx, and it extends laterally for a short distance on to the gluteal regions. This, the zone of distribution of the posterior primary divisions of the mid sacral nerves, is the area affected by pathological conditions of the cervix uteri.

In the description of these observations, reference has been made merely to areas of tenderness and pain. It is only necessary to state that more careful observations serve to show that the other nerve functions may also be affected along definite areas.

In well-marked cases, the heat sensation is exaggerated, and, in acute inflammatory conditions, the motor filaments are much more responsive than normally to external stimuli. The trophic nerves may also be affected, as the following case would seem to imply.

A source of fallacy in diagnosis from abdominal examination lies in the fact that gynæcological conditions are frequently multiple. The relative tenderness of the various points must therefore be taken into account. It will be found that the ovarian point is the most responsive and the uterine least, so that a minor ovarian lesion may give rise to as much tenderness as a more extensive uterine affection. Again, a slowly growing tumour of either uterus, or ovary, rarely of itself gives rise to any area of tenderness. It will be seen that the areas marked out bear no relationship to the position of the viscus affected. Thus a congested ovary, lying in the pouch of Douglas, will give the usual ovarian point, or a retroflected uterus the uterine points. Again, unless some definite pathological condition of an inflammatory nature is present, tenderness is likely to be absent. A large uterine fibroid, for example, may exist without any evidence in these areas. A great deal of confusion, in the interpretation of areas of tenderness, arises from the fact that, in a bimanual examination, pressure made over the supposed site of the ovary is also pressure applied to the uterine point. This has frequently led to a diagnosis of ovaritis, when the condition was purely uterine. Further, the hand on the abdominal wall can easily cover several of the areas, and this point is emphasised in the British Medical Association discussion already referred to. In opening this discussion, Herman[1] stated that: "The maximum point is

[1] *Brit. Med. Journ.*, 1904, Vol. II., pp. 1055 *et seq.*

about half-way between the umbilicus and the anterior superior iliac spine. Pain and tenderness in this spot may be produced by disease of the ovary. But it may also be produced by disease of the bowel, uterus, Fallopian tube, liver, gall-bladder, kidney, or ureter." With this statement, our observations are not in agreement. The areas of maximum tenderness for the uterus, tubes and ovary are as distinct from one another as the segmental nerves on the abdominal wall.

The explanation of the position of the tender areas presents considerable difficulty. Reference has already been made to the view that, in the case of the uterus, the tenderness may be due to dragging on the round ligaments, an explanation which of course does not apply to the ovary or tube. The points in favour of the mechanical theory are: (1) the position of the round ligaments; (2) the increased size of the uterus; (3) the dragging nature of the pain. With regard to the position of the ligaments, it may be pointed out that, in retroflexion of a healthy uterus, although the mechanical conditions are present, pain is not necessarily complained of. Again, in chronic conditions, in which pain is persistent, it will often be found that the ligaments are so greatly elongated that very little strain can fall on them. Increased size of the uterus is also a doubtful factor, for cases occur in which there is a slow but considerable growth of the uterus, *e.g.*, some cases of uterine fibroids, where pain is not a feature of the case; or the case of chronic metritis, in which the pain disappears for a time after curetting, may also be instanced. The dragging nature of the pain may have another explanation. In a case of chronic metritis, for which electrolysis was tried, whenever the faradic current was suddenly increased, the patient complained of a dragging pain, although the uterus was in its usual position.

The view, which seems to best meet the facts of the case, is that the nerves of definite segments of the body wall are in a state of increased excitability. The definite manner in which the areas are localised, shows, further, that distinct segments of the body wall are related to definite viscera, the connecting link being either a posterior root ganglion, or a segment of the cord. McKenzie[1] has for some time advocated

[1] *Brit. Med. Journ.*, June 23 and June 30. 1906.

the view that viscera are not sensitive to pain. Any stimulus, sufficient to give rise to a sensation of pain, is felt not in the viscus, but as pain in the associated segment of the body wall. This view is in accordance with many of the observed facts.

Again, recent researches tend to show that the nerve cells, in a segment of the cord, undergo changes as a result of any lesion in the corresponding segmental area of distribution. It is probable then, that impulses, or transmitted infection, from the viscera, give rise to an excitable condition of a spinal segment. In this condition, impulses from the somatic area, which, in ordinary circumstances, would be felt as tactile, are translated as tenderness and pain. The trophic and vasomotor changes, which take place in the body segment, tend to show that, in addition, new impulses are actually transferred along the nerve. The effect of these will be to further alter the existing irritability of the spinal segment.

Incidentally, the importance of this in treatment may be mentioned. If a direct path exists from the viscus to the body wall, it seems reasonable to suppose that impulses may be transmitted in the opposite direction. In applying irritant, or sedative, applications, therefore, the best results should be obtained by local applications to the correlated areas.

From an anatomical point of view, the results seem to present some features of interest. The nerve supply of the generative organs is derived from various plexuses. By clinical investigation, we can apparently complete the results of dissection, and state that the filaments of supply from the plexuses are derived from definite segments of the cord. Thus the ovary is supplied by the 11th dorsal, the tube by the 12th dorsal, and the body of the uterus by the 1st, or 1st and 2nd lumbar segments. The cervix uteri, on the other hand, is supplied by the 2nd, 3rd and 4th sacral nerves. The double nerve supply of the uterus is interesting in view of the fact that the bladder and rectum also have double nerve supplies. In the case of these latter, we recognise that the distinction is a developmental one, the base of the bladder and the anal canal being developed in association with an invagination from the external epiblast. Such an association is suggested in the case of the cervix, although there is no embryological evidence of it.

SOME REMARKS ON ACUTE ABDOMINAL PAIN.

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The question of the conditions underlying an attack of acute abdominal pain is obviously one of great importance, and I shall endeavour to draw attention to some points which it is essential to bear in mind when dealing with such cases.

A very brief consideration of the causes of pain felt in the abdomen at once makes it evident that cases of this kind may be divided into two main classes.

(i) Those where the pain is merely referred to the abdomen, the morbid condition giving rise to it existing in some other part of the body.

(ii) Those where the pain is due to intra-abdominal disease.

Taking the first class, we frequently find mistaken diagnoses arising from failure to bear in mind the existence of such referred pain. Diseases of the pulmonary and nervous systems are perhaps the most likely to give rise to such mistakes. It is well known to all, though, as I have mentioned, sometimes overlooked, that intra-thoracic affections may give rise to acute pain, which is referred to the abdomen. Such pain, coupled with the evident illness of the patient, has before now led to a laparotomy being needlessly performed. In most cases a thorough examination of the patient, combined with careful consideration of the various points observed, would have obviated this, and I may well take this opportunity of urging most strongly the necessity of making such an examination, and the care that is needed to avoid focussing too much attention on what at first sight appears to be the seat of the disease.

To consider a little more in detail the thoracic conditions which may lead to error, we find that an early pneumonia or pleurisy involving the lower lobes may, and frequently does, cause pain referred to the lower abdomen, and this, when on

the right side, may give a superficial resemblance to acute appendicitis.

Dr. Hood[1] has recently recorded a series of interesting cases, in some of which the first signs of pulmonary disease were referred to the abdomen, and makes the suggestion that in all cases where a high temperature accompanies certain abdominal symptoms the chest should be suspected.

The chief points which should draw attention to the chest in such cases should be :—

1. The character of the respirations, *i.e.*, whether of the pneumonic type or indicating pulmonary trouble.

2. The temperature, if much raised.

3. The character of the abdominal pain, *i.e.*, whether the tenderness on palpation is due to superficial cutaneous hyperæsthesia (referred pain), or whether to tenderness brought out on deeper palpation.

To turn next to the nervous system, there are several conditions which may lead to error in the diagnosis of abdominal pain, perhaps the commonest being tabes dorsalis. I have recently had the opportunity of seeing three patients, in all of whom appendisectomy has been needlessly performed, the appendix in each case having been healthy, and the patient naturally unimproved by the operation. The difficulty in diagnosis is enhanced in some cases by the atypical (if one may call it so) onset of tabes. The following case which I have had under observation in the casualty department at St. Bartholomew's Hospital well illustrates this point. The patient, a man aged 35, had been for two years suffering from acute abdominal pain associated with vomiting, which occurred from time to time, each attack lasting about ten days. His appendix had been removed, but he did not benefit from the operation. On examination he presented the following clinical picture. The pupils were slightly irregular in shape, reacting only very slightly to light, whilst both acted well on convergence. The knee jerks were present, but ankle jerks were absent, an important point, as it is well known that in tabes the loss of ankle jerk may precede that of the knee jerk by some time. There were slight sensory changes, notably a slight ulnar anæsthesia to pin-prick. This, coupled with the

history given (gastric crises), quite justified a diagnosis of tabes.

Caries of dorsal vertebræ, especially in children, may cause acute pain referred to the abdomen, when no obvious affection of the spine exists, and is only to be found by very careful examination. Similarly, neuralgia of the intercostal nerves, whatever the exciting cause, will produce a similar train of symptoms. This is well seen in some cases of tumour of the spinal cord, which are perhaps more likely to be overlooked than cases of caries. As an instance of this, the following case is noteworthy:—A man, aged 49, complained, in November, 1904, of severe pain radiating into the right hypogastrium. The pain was so severe that he had to give up work. He was treated at the time for appendicitis. In January, 1905, he again suffered from similar severe attacks of pain, and on this occasion appendisectomy was performed, and a normal appendix removed, subsequent to this he began to notice and complain of numbness of the legs, the numbness extending up to the waist, weakness of the legs and retention of urine. A diagnosis of tumour of spinal cord was then made, and subsequently confirmed at autopsy. In this case, as the symptoms seemed to point to abdominal trouble, a proper examination of the nervous system had not been made till too late to be of practical value. Dr. Hood records a somewhat similar case, where the pain from a tumour of the spinal cord was attributed to renal colic.[1] At other times pain from a similar cause has been assigned a "functional" character and treated as hysterical—in one case the patient being treated on this assumption till she became unable to walk, when a tumour of the spinal cord was diagnosed, and, in this case, successfully removed. Examples of such cases could be multiplied almost indefinitely. They all teach the same most important lesson—the necessity for making a thorough examination, not only of the abdomen, but of the whole patient.

To turn to the consideration of abdominal pain proper, we find ourselves confronted with a formidable array of conditions into which it is impossible to enter in detail. I shall confine my remarks to those conditions where the cause of the pain is most often uncertain, and where the physical examination fails to reveal the presence of any

obvious organic abnormality, such as tumour of any kind or inflammatory swelling. Gynæcological cases are thus excluded, for in the vast majority of cases of acute pain due to the female pelvic organs, physical examination will reveal the presence of some pathological condition.

The conditions where the diagnosis is uncertain, at all events in the early stage, are usually those associated either with "peritonism," obstruction, or one of the various forms of colic.

In all cases it is most important to obtain a full and accurate history of the illness, and in obtaining such a history special stress must be laid on the following points :—

(1) The patient's occupation, noting particularly any possibilities of lead infection.

(2) The character of the pain itself : was the onset sudden ? where was the pain first felt, and where was it subsequently localised ? whether there have been any similar previous attacks ? As pain is a subjective phenomenon it is essential to form some estimation, if possible, of its severity at the time of onset. Enquiries should, therefore, be made as to whether the pain caused vomiting or collapse, whether it "doubled the patient up," and so on.

(3) The question of colic ab ingesto must be considered. Did the pain follow a meal of any suspicious article of food —tinned things particularly—or had any drugs been taken ?

Having carefully weighed the evidence obtained the examination of the patient must next be undertaken.

Important points to be noticed are the facial expression, the tongue and the gums (Burton's blue line).

The pulse, temperature, and respiration should next be noted, especially the first, as the pulse is a more certain guide to the severity of the condition in abdominal disease than either the temperature, or the respirations : consideration of these may, however, point to the presence of some thoracic condition simulating abdominal disease.

A leucocyte count should also be made, as this may give important information not only as to the presence or absence of peritonitis, but also as to the nature of the infection.

The pain met with in abdominal disease is of two varieties, (1) deep pain felt in the affected organ ; (2) superficial referred

pain and with this a cutaneous hyperæsthesia will usually be found associated, as Head[2] has conclusively shown.

In doubtful cases this cutaneous hyperæsthesia may be of much value, as from its distribution it will give a clue to the organ affected. As an example of this one frequently finds, in cases of gastric ulcer, pain complained of in the epigastrium and back, and, on testing the skin with a pin point, the cutaneous distribution of the seventh dorsal segment is frequently found hyperæsthetic.

The diagnosis between the various forms of colic and "peritonism" due to rupture of some part of the gut, or the stomach is in many cases easy, but in some few most difficult.

Colic ab ingesto usually, but not always, follows an indiscreet meal, or there is a history of more than one individual in the household being affected. The pain, as a rule, is referred to the umbilicus and is relieved by pressure, is paroxysmal and usually ends as suddenly as it may have begun, and often with the passage of flatus. When the pain is very severe the expression may become strained and anxious, but it never assumes the typical Hippocratic type. The pulse is as a rule slow, the abdomen is usually slightly distended, and peristaltic movements may sometimes be visible; on the other hand the abdominal muscles may contract rigidly with resulting retraction of the abdomen. A constant desire to micturate also not infrequently occurs. The case may be confounded with lead colic, biliary or ureteric colic, with perforation of either the stomach or duodenum, or with acute obstruction of the small intestine.

Lead colic can as a rule be fairly easily diagnosed, the history may throw light on the subject showing a possibility of this infection having occurred. The patient will almost certainly exhibit the characteristic anæmia, and a blue line will often be found in the edges of the gums, provided the oral sepsis is sufficiently pronounced. The fact must not be overlooked that this blue line may be present in patients who are *not* suffering from plumbism.

Should the colic be severe the patient is usually restless, but the abdomen is not as a rule hyperæsthetic. Pressure relieving the pain, which is frequently unilateral. In this connection it is interesting to note that the pupils and pulses during the

attack are often unequal. The pulse is small in volume. Little urine is passed. No rise of temperature occurs, the abdomen is retracted, and lead may be found in the urine.

Ureteric colic does not, as a rule, give rise to difficulty in diagnosis owing to its well-defined train of symptoms. The pain in such cases is complained of in two localities. (1) A point a little below the ninth costal cartilage in the mid clavicular line--the paracentral point, and (2) from the loin radiating downwards to the testicle, and along the inner side of the thigh following the cutaneous distribution of the 11 or 12 dorsal and first lumbar segments, the testicle on the same side is often retracted, the urine almost invariably contains blood. Dietl's crises in association with movable kidney may mislead, unless the possibility of such a condition is borne in mind. Biliary colic, or the pain arising from disease, usually calculus of the gall bladder may be more misleading, especially the latter condition, although in the typical attacks difficulty seldom arises, the pain radiating towards the right scapular region on the one hand and towards the umbilicus on the other.

West[3] has recorded a case where severe abdominal pain, associated with rigor during an attack of typhoid fever gave rise to much anxiety till the development of jaundice cleared up the diagnosis.

Gall bladder pain may be mistaken for gastric pain, an instance of which has been recorded by Sir Dyce Duckworth.[4] The patient, a man aged 26, was admitted to St. Bartholomew's Hospital suffering from acute pain in the epigastrium of sudden onset, and severe enough to double him up. The pain was attributed to gastric ulcer, but ultimately after many weeks jaundice developed. The patient was operated on, but died, and at autopsy a hydatid of the liver was found which had ulcerated into the gall bladder and caused obstructive jaundice.

In conclusion, there remains the pain associated with peritonism due to perforation of the stomach or gut. In some cases the diagnosis is easy, but in others this is by no means the case, and, as success in operative treatment depends largely on early diagnosis, it becomes urgently important to make a correct one as soon as possible. In cases where perforation has taken place the history given is that the patient was

suddenly seized with sharp stabbing pain in the upper part of the abdomen which momentarily doubled him up—most probably he vomited, and the vomit may have contained blood. There may or may not be any previous history of pain after food, as in some cases perforation is the first sign of an ulcer.

After the first onset the pain becomes diffused, but chiefly most noticeable in the upper part of the abdomen, and any pressure in that region is as a rule not well tolerated. The pain in cases of peritonism is characterised by its diffuse character, and also by the fact that it follows no particular segmental distribution. The patient is restless, looks very ill, and soon develops the typical pinched Hippocratic facies, with sunken eyes, pale lips, drawn expression, and clammy perspiration. The pulse is small and rapid, and, if examined at intervals, will be found to be rising in frequency. The temperature is variable, depending on the amount of shock, or reaction which has set in—subnormal, normal, or raised.

The respirations are slightly increased in frequency. On examination the abdomen will be found somewhat distended, it moves badly on respiration, and is hyperæsthetic both to light and deep palpation. Liver dulness may be absent, though this is certainly not always the case, but a liver dulness which diminishes under observation, is of the greatest diagnostic value.

The blood, if examined, will probably show a leucocytosis with an increase in the polymorphonuclear variety. But this depends on the power of the individual to react to the infection which has occurred, and is absent in the most toxic cases.

Usually after the first onset a quiescent period occurs with general abatement of symptoms, and the quiescent period is a time of the greatest danger owing to the sense of false security to which it gives rise. In all cases, where the onset has been very severe, the patient should be kept under close observation, and the following points relied on for making a diagnosis and at the same time indicating immediate operative treatment.

(1) Increasing rapidity with diminution of volume of the pulse, especially if associated with a falling temperature.

(2) Any indication of free gas or fluid in the abdomen.

(3) Diminishing movements of the abdomen during respiration.

(4) Gradual concentration of pain and tenderness at one particular spot in the abdomen, corresponding to the site of the lesion and gradual diffusion again from this spot as general peritonitis sets in.

Cases, however, will occur in which, after the most careful consideration, it is impossible to make a certain diagnosis. In these, should the collective evidence point to the probability of rupture, an exploratory operation should be performed at once, lest delay, which hourly lessens the patient's chance of recovery, should cost him his life.

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ANURIA.[1]

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The occurrence of suppression of urine, or anuria, is sufficiently serious under all conditions, but, when this accident supervenes after surgical interference with the kidney, urethra, or bladder, it can only be adequately described as a surgical catastrophe.

It is not my purpose to discuss those forms of interference with micturition, which result from obstruction in the urethra, except in so far as they concern the subject before us, but I wish to consider those conditions under which, from some lesion of the kidneys, their nerves or their ducts, no urine, or, at most, a quantity quite incompatible with life, enters the bladder.

In spite of much clinical observation and experimental investigation, it will be seen, in the course of this paper, how little true knowledge we have of the functions of the kidneys in relation to disease, and how intricate and numerous are the problems, which the future must unravel if our treatment is to be placed upon a sound, and not upon an empirical basis.

For the purpose of subdivision of the main forms of anuric cases, no classification will serve better than the original one of Sir William Roberts, who divided them into obstructive and non-obstructive groups, and no paper or writing on this subject can be complete without a respectful tribute to, and an acknowledged reference to the works of, this great authority on renal disease.

At the same time, these two subdivisions cannot be said to include satisfactorily certain forms of anuria, which arise in the course of renal or vesical disorders, and which, therefore, will be discussed under a third heading "Reflex

[1] Paper read before the Isle of Thanet division of the British Medical Association.

suppression," and it is the special interest of these cases, their pathological obscurity, and their clinical importance, which make them an attractive subject for a medical discussion.

Non-obstructive anuria, as occurring in acute inflammatory affections of the kidney, whether caused by poisons formed idiopathically in the body, or ingested with the food, or whether occurring in the later stages of gross organic renal change, as in cystic disease, is satisfactorily explained.

The kidney, an organ very susceptible to the vascular changes of inflammation, becomes clogged with the débris of the inflammatory outbreak, the lumen of the tubules becomes choked with the swollen epithelium blood and albumen, and secretion is arrested. Unless, by our treatment, we can relieve this overloaded condition, the patient passes into a state of uræmia and dies. So much for the acute inflammations; but in the chronic degenerations, the progressive fibrosis of the intestitial connective tissue, or the gradual conversion of the renal parenchyma into cystic spaces, is fraught with the same danger of suppression, though absolute anuria is less common, and is apparently due to the supervention of acute nephritic changes, or to the complete destruction of the renal cells.

Now, when we turn to obstructive anuria arising from the impaction of calculi, or from blockage of the ureters by growths or stricture, we at once meet a striking contrast and a peculiar dissimilarity between these two types of suppression.

In the first place the duration of life, after the onset of the anuria from obstruction, is not measured in hours, as in the cases of non-obstructive suppression, but in days and even weeks, and, secondly, those groups of clinical symptoms, known as uræmic, do not usually appear.

Calculous anuria, the commonest variety of this type, which has practically only to be separated from the obstruction caused by such growths as carcinoma of the uterus, is very peculiar in this respect, and instances are recorded in which a patient has survived a state of anuria from impacted calculus for periods varying from fifteen to thirty days.

I have seen three fatal issues from calculous suppression, but in no one of them were symptoms noted which could fairly be described as uræmic. In each there was a marked

quickening and weakening of the pulse, but there were no tremors, and consciousness was maintained until the last.

In some of the text-book descriptions of this disease, it is stated that, in the final stages, uræmic symptoms have been noticed, but no convincing details have been given of them, and it is probable that, in those few instances where they have actually appeared, there has been an attendant acute inflammation, or a suppurative pyelonephritis. These statements are not only supported by many reported clinical cases, but also by the experiments of Bradford on ligature of the ureters, for in the series of animals, upon which he operated, death did not take place with typical uræmic symptoms.

What then are the factors which cause such a curious clinical difference between these two groups of cases? In acute nephritis, the urine is suppressed as the result of obstructive changes in the smaller tubules, in obstructive anuria, by a blockage in the larger ducts. In the former, we may assume that the tissue is extensively damaged, in the latter, that it is at the time of the obstruction in most cases moderately healthy.

It was this gross discrepancy between the behaviour of the obstructive and non-obstructive cases, which formed a powerful argument in favour of Bradford's theory of internal renal secretion. This internal secretion of the kidney may act in several ways, it may neutralise certain poisonous substances as they are brought to the gland for excretion, and, so long as the cells are healthy, this act of neutralisation may be effected, for it is well known that poisonous precursors of urea are formed in the body. Or, on the other hand, there may be poured into the blood stream some secretion which acts in some obscure manner in the economy of the body, as in the case of the suprarenal capsule. Whichever of these hypotheses we accept, we seem to find in it some explanation of the factors which prevent the development of uræmic symptoms in the obstructive forms of anuria.

Experimental evidence has been very unsatisfactory in fixing the blame of uræmic complications on any one particular constituent of the urine which should have been excreted, and, without referring to the various theories which from time

to time have been propounded, I suggest that it is not the suppression of urine *per se* to which uræmia is due.

As illustrative cases of obstructive anuria, I will give a very brief account of three. The first I was connected with while acting as house surgeon.

The patient was a large bulky man, aged 59, who previously had enjoyed good health with occasional attacks of renal colic. In September 1902, eight days before admission, after returning from a walk, he had some left-sided pain and voided a small amount of blood-stained urine. From that time he never micturated. Various forms of treatment were tried without effect, and he was finally sent up to the hospital on the eighth day of the suppression.

When I saw him, he was, in the words of Roberts, "calm and free from distress" though deeply interested in his very uncommon condition. The pulse was 82 of good volume, the temperature normal. Examination of the loin was unsatisfactory owing to his bulk, but it was obvious that the left side was more rigid than the right. Nothing abnormal could be detected P.R. The bladder was empty.

As the diagnosis admitted of no doubt, matters were explained to the patient, who, rather unwillingly, consented to an operation. Indeed in this, as in my other case, some trouble was experienced in convincing the patient that operative measures were imperative; for, as he said, he felt quite well.

Under anæsthesia, a large mass could be felt on the left side of the abdomen. The kidney, enlarged and congested, was exposed, but no stone could be felt in the pelvis, or in the upper part of the ureter. Nephrostomy was accordingly performed. Profuse hæmorrhage, which was only controlled by plugging, accompanied the incision into the renal tissue. This completed the operation. On coming round from the anæsthetic he was restless and in great pain. Some morphia was given in small doses. About six hours after the operation, which in his case had unfortunately been deferred too long, the pulse began to fail and his respirations became laboured. He sweated profusely, and about 7½ hours from the time of his admission he died, retaining his consciousness to the end. There were no tremors and he never vomited.

Post-mortem examination showed a soft friable calculus, about the size of a filbert, blocking the left ureter below the brim of the pelvis. The right kidney was hydronephrotic, and the ureter was strictured.

The second case occurred in a man of similar bulk, whose age was 56, and was reported in the *Lancet* of January 13th of this year. In this instance, the previous history of renal calculus was not convincing. He was, however, seized with a typical attack of colic, followed by suppression.

There was rigidity on the affected side, and, as all other means failed to overcome the anuria, I cut down and extracted a small stone from the middle of the right ureter. There were no complications, and he entirely recovered.

The third case illustrates the suppression from another cause. The patient, a female, had suffered from attacks of renal pain right and left, but was admitted into a medical ward with acute renal paroxysms. Shortly after her admission, it was noticed that no urine was being passed, and it was then suggested that she was suffering from calculous anuria. Examination of the vagina, however, revealed a large fixed carcinoma of the cervix. No previous attention had been directed to this region. I may mention that she was German, and did not understand a word of English, which fact complicated our examinations very considerably. As we had to deal with an obstructive suppression, from a cause other than that of calculus, the left kidney was exposed by the usual lumbar incision. There was considerable congestion, as in the previous cases, although the hæmorrhage was not so severe. The ureter was pervious to a point 8 or 9 inches from the kidney, presumably where it passed by the side of cervix. Nephrostomy was, therefore, performed, and all the urine secreted passed through this opening. She survived for several weeks.

Having thus considered certain forms of obstructive anuria, I will pass on to the next group of cases which, for the present, I will call reflex, or nervous, and it will be necessary, in the course of this discussion, to inquire critically into the conditions to which these terms have been applied, and to ascertain, as ar as possible, how much they are deserved.

Under this heading we must consider the following varieties:—1. Hysterical anuria. 2. Anuria after injuries to

the kidneys. 3. Anuria following obstruction to one ureter, the other kidney being sound. 4. Anuria after abdominal operations. 5. Anuria after operations on the lower urinary tract.

Hysterical Anuria.—Excluding with due care those cases in which fraud may have been practised, we have still left for consideration a few examples in which anuria of this type has occurred.

The best known and most frequently quoted instance was originally described by Charcot, suppression being present for eleven days, the patient ultimately recovering. At first sight it is very hard to accept these cases as genuine, but, upon further consideration, it will be found that they are capable of more satisfactory explanation than other better-known and well-accepted varieties.

In the first place, it will be generally acknowledged that hysteria is undoubtedly a nervous derangement, and nervous disturbance, as will be shown later, has a definite action upon renal secretion. Again, hysterical contraction of the muscular tubes of the body is of fairly frequent event, as, for example, in globus and certain states of the intestine. Only the other day I read the account of a case where colotomy had been performed for acute intestinal obstruction. There was, as was shown later, no organic basis for the obstruction, and the case appeared to be one of the group to which attention has recently been directed by Dr. Hawkins under the head of enterospasm. If then some nervous storm can affect the larger muscular tubes of the body, is it unreasonable to suggest that the ureters may be similarly involved? I admit the danger of arguing by analogy, but, in the present instance, I do so in order to support Charcot's original explanation that hysterical anuria was due to spasm of the ureters.

As yet I have only come across one case to which the term hysterical could be applied, but, as in this instance, there was also some organic bladder trouble, I am not justified in quoting it under this heading, but shall refer to it later.

Anuria after Injuries to the Kidneys.—In this group, I also include the anuria which sometimes supervenes after renal operations. The first point of importance for consideration is whether a healthy kidney is present on the side opposite, for

that being so the explanation of this accident will be better considered under the next heading.

Apart from this, it is advisable, in all cases in which an operation on the kidney is impending, to use every means at our disposal, and they are numerous and accurate, in order to ascertain the presence of the organ on the opposite side. Only in this way can those terrible disasters consequent upon the removal of the only functioning kidney be averted.

Anuria resulting from Obstruction of one Ureter, the opposite Kidney being apparently healthy.—This section touches on an interesting and much-debated subject, and it cannot be said that we have yet arrived at a state of unanimity with regard to it.

Many authorities will be found to throw doubt on the occurrence of such a condition, while, even if we accept, as I think we are bound to, the actual anuria, its explanation is a matter of considerable difficulty. If we are able to establish as a fact that, as the result of pathological changes in one kidney or ureter, suppression of function may occur in the opposite organ, we are adding another complexity to the already intricate subject of renal surgery. The first suggestion of such a possibility was made by Nicolai in 1781. Writing at that time, he puts the question, "How can a stone in one kidney cause suppression in the other?" At present we are in a position to state, with some confidence, that this phenomenon can be brought about, but, as will be seen later, the explanation is still *sub judice.*

Israel, whose experience on renal surgery is probably unrivalled, collected all the published cases together with those that had occurred in his practice, and came to the conclusion that reflex stimulation of one kidney had a distinct influence on the other, and, since that time, many instances have been put forward in support of this opinion.

Experimental evidence throws some light on the matter, and shows that there is undoubtedly a relation between the activity of the two organs. Claude Bernard, by irritating the nerves of the hilum of one kidney, produced anæmia and anuria of both.

Cohnheim and Roy produced reflex anuria by stimulating the proximal cut end of the sciatic, and showed the bulk of

the kidney diminished 10 per cent. Masius stopped renal secretion by stimulating the vagus, but Eckhart showed that these latter results were due to a fall in blood pressure, and were of short duration only, unlikely to be permanent.

Israel published later an exceedingly interesting and instructive case, in which there was a hydronephrosis on one side, which gradually accumulated until the opposite kidney ceased working; drainage of the hydronephrosis was followed by prompt recovery of the opposite organ. That this was not a transient and accidental condition was proved by the fact that the same sequence of events was repeated on three or four occasions.

As the result of these later observations, Goetzel, working under Israel's instructions, found that, if the pressure in one renal pelvis was raised, there was a gradual diminution in the amount of secretion from the opposite kidney, until finally anuria was produced.

The only case which illustrates this form of suppression, which has come under my notice, was that of a patient at the French Hospital. He was a chauffeur, and had previously suffered from attacks of pain in the right renal region. For these crises, as they were called, he was treated with sedatives, the opinion being expressed at the time that they were due to a renal calculus. He gave a definite account of two such attacks, one on the 18th December 1904, the other on the 1st January 1905. Each lasted about five days, and he then apparently completely recovered.

On the occasion on which I first saw him, July 15, 1905, he had been suffering for a week from severe pain in the right side, with vomiting, the pain radiating down to the testicle. The right side of the abdomen was so extremely rigid that neither I, nor my colleague, Mr. Owen, could detect any definite tumour. There was pyrexia at night, the temperature varying between 101 and 102.

There was nothing that threw any further light on the condition to be found on examining the urethra or urine, for repeated investigation of the latter showed (on one occasion only, nothing beyond a few pus cells). The sp. gr. was 1015, the reaction alkaline, some deposit of phosphates, no

albumin, blood, or sugar. It was of course impossible, at this period, to make a definite diagnosis, for the few pus cells which the house surgeon found, on one examination, were not alone a sufficient basis for a definite conclusion. The maximum pain and rigidity were undoubtedly renal, and, as perhaps he was passing urine somewhat more frequently than usual, we surmised, after a few days, that he had a renal calculus. A radiograph was taken, but no shadow was discovered; but, as he did not improve, it was decided that the right kidney should be explored on Tuesday, July 25. On Monday, 24th, he did not pass water, whereupon the house surgeon passed a catheter, but drew off no urine. There was some trouble in passing the instrument as the patient was very nervous, and the manœuvre caused him a great amount of pain, hence the house surgeon came to the conclusion that a stone had come down from the kidney and was now blocking the urethra. I saw the patient the same night at 11 o'clock, and, under anæsthesia, passed a catheter into the bladder and found, to my surprise, that the bladder was absolutely empty. It was, in fact, a case of suppression, and not, as had been thought, of retention. On examining the renal regions, a large mass, hitherto masked by the rigidity, was felt on the right side, and it was thought advisable to proceed with operation which had been fixed for the next day. I cut down through the loin, and came upon a large distended kidney embedded in a mass of inflamed and indurated perirenal fat. This perinephritis extended, as well as we could judge, along the ureter into the pelvis, and it was for all the world like cutting through uncooked bacon. No stone was felt in the renal pelvis, so, after the wound had been well retracted (it was quite impossible to bring the organ up to the surface), an incision was made along the convex outer border, into its pelvis. This at once liberated about 10 ozs. of stinking purulent urine, but no calculus could be felt, although the interior of the kidney was thoroughly explored. The renal tissue was friable and rotten, and the whole organ appeared to be in such a state of disorganisation and infection that, had the anuria not been present, I should have considered the advisability of removing it. I did not consider it advisable, and after events showed

that this was unfortunate. Two large drainage tubes were inserted, one into the kidney, and the other into the perirenal space.

On the next day, he was free from pain and was passing urine freely. The urine, which was of low specific gravity (1,009 grs.), increased in amount, and on the third day measured 80 ozs. The temperature fell to normal, and we had reason to believe that the chief danger was over. On August 5, there was some hæmorrhage from the wound, and, for the first time, blood was present in the urine. This made us suspect that a stone had been overlooked at the time of the operation, but it was not considered wise to attempt anything further at the moment. On the 9th and 13th, there was more hæmorrhage, and it was clear (from the character and amount of the bleeding after this last attack) that we had to deal with secondary hæmorrhage. The lumbar wound had healed by first intention, except where the tubes had been inserted, and it was decided (having in mind the fixation of the kidney that was present at the first operation) to attack the organ from the front.

An incision through the linea semi-lunaris was made, and the wound rapidly deepened down to the kidney. The peritoneal cavity was packed off, and the renal pedicle isolated. The whole kidney was found to be in a necrotic state, embedded in inflamed perinephritic fat, and with the greatest difficulty a ligature was placed around the vessels. No sooner was the kidney removed than furious hæmorrhage took place, owing to the ligature tearing through the rotten tissues of the pedicle, for it was found that the destructive process had tracked along the line of the artery, and that the secondary hæmorrhage was due to ulceration of the main vessel. The bleeding was controlled with forceps, but the blood lost on the previous occasions had so reduced his strength that he never rallied from the operation, and died half an hour afterwards.

The autopsy showed that the other organs of the body, the bladder and the left kidney were healthy; the right kidney, which had been removed, was full of small abscesses, and was gangrenous in parts.

Cultivations, both from the wound during life and from

the kidney after death, gave pure cultures of the colon bacillus.

Such a case presents many points of interest. First, it illustrates the infection of the kidney by bacillus coli, presumably from the intestinal tract, such infection being unilateral; secondly, it shows clearly that, with a rise of pressure in one kidney, anuria may be set up, the other being normal, from first to last, there was no evidence of any damage to the left side; thirdly, it shows that sloughy states in the kidney tissues are attended by the same danger of secondary hæmorrhage as in other parts of the body; fourthly, it raises a number of questions as to diagnosis and treatment, which time will not permit me to consider. One special detail I would allude to, and that is the intense amount of perinephritis, and I think that this affords some explanation as to why reflex suppression of this nature is not commoner. Simple obstruction of one ureter may produce reflex anuria, but this accident is much more likely to supervene, when there is infiltration and involvement of the renal plexus by an intense perinephritis.

I have recently received a verbal account of a somewhat similar case in Professor Guyon's wards from one of his assistants.

So far then we seem to have satisfactory proof that obstruction to one ureter may lead to anuria, the opposite kidney being healthy, and we cannot therefore refuse to accept the term reflex, and some explanation is afforded for those cases in which, after renal operations, suppression has supervened. At the same time, we must admit that we have not reached the end of our necessary investigation in coming to this conclusion, for it still remains for us to determine in what manner this nervous influence is exerted.

Anuria following Abdominal Operations unconnected with the Kidneys.—This complication has occurred in a large number of reported cases, amongst which may be mentioned those reported by Byrne, *Australian Medical Gazette*, April 1903, and Eustace, *Brit. Med. Journ.*, 1896, the latter recording an instance of suppression lasting 21 days after the removal of an ovarian cyst.

Before we blindly accept the suggestion that the shock of

the operation has produced reflex anuria, it is necessary to eliminate other causes which may lead to the same result.

In the first place, the lowering of the blood pressure, which follows any prolonged abdominal operation, will cause a diminution in the renal secretion as already mentioned in connection with Masius' experiments; secondly, the anæsthetic, a poison capable of producing anuria from irritation of the renal tissue, has to be considered; thirdly, the possibility of the ureter having been damaged, not necessarily cut but bruised and so temporarily obstructed, must be taken into account; and fourthly, the probability that, in most of these cases, a diseased state of the kidneys was present from the first, with the result that the shock of the operation, combined with the effect of the anæsthetic, was sufficient to cause an already damaged and overcompensated organ to cease work altogether.

In most cases, in which the kidneys have been carefully examined after death from suppression, petechial hæmorrhages, acute congestion and evidence of inflammatory change have been observed; if, however, the ureters were compressed by some tumour, for which the operation was performed, anuria, occurring subsequently, would come under the next heading.

It does not seem as if there was any evidence yet to show that general nervous disturbance, following abdominal operations, can alone produce permanent and fatal anuria in patients, whose kidneys prior to the operation were healthy, and although it is true that, in diffuse peritonitis in cholera and allied diseases, some degree of anuria is often present, this can only be regarded as an incident associated with the lowered blood pressure and attendant toxæmia, and is not *per se* a cause of death.

Anuria after Operations on the Lower Urinary Tract.—I now turn to those cases of anuria which occur after the operative treatment of stricture and enlarged prostate, and, from a practical point of view, they form the most perplexing and disappointing series with which we have to deal. A man comes with retention of urine; a catheter is passed, the urine is withdrawn, and all seems well. Shortly after he has a rigor, the urine diminishes in amount, and occasionally, in spite of prompt and energetic treatment, the result is death.

When I was a house surgeon, a patient, a bus driver, was admitted with retention of urine due to a very tight stricture.

Unable to pass any instrument, I aspirated his bladder above the pubes, and, on the next day, my surgeon performed an external urethrotomy. It was a very difficult operation, and he did not tie in a perineal tube or catheter.

The urine did not show any evidence of renal damage, there was no pus or albumen, and the sp. gr. was 1019, the urea was not estimated.

All seemed to go well at first, but on the next day he had a rigor, the urine diminished, and, on the third day, none was passed. The question naturally arose as to whether, knowing the difficulty that had been experienced in finding the opening into the bladder at the operation, the urine had been extravasated behind the triangular ligament into the pelvic cellular tissue.

In order to settle this point, we had to pass a catheter into the bladder, a very difficult proceeding in the circumstances, as we dared not give him an anæsthetic, and, I regret to say, he suffered a good deal of pain. The final result of our endeavours was to show that there was no extravasation, and the recollection of the trouble, which we had on that occasion, has since compelled me, in all cases of external urethrotomy, to tie in a rubber catheter or a perineal tube.

As the case was now clearly one of suppression, we proceeded to treat him to the best of our ability, but without result. His temperature ran up to 104, his pulse became weaker and more rapid, and he died next day.

At the autopsy, the kidneys did not present any gross change to the naked eye, but under the microscope showed some patches of round-celled infiltration of the interstitial tissue. There was certainly no pathological evidence of an extensive destruction of kidney substance such as one finds in acute nephritis.

A second case, which I saw last year, occurred in a girl, who was sent into the hospital with cystitis. Three days after admission, it was noticed that she was not passing any urine, and had not in fact passed any for 24 hours.

Examination revealed some blockage of the bladder end

of the urethra, and, on dilating the canal, I extracted three pieces of pencil averaging 4 inches each. The bladder was encrusted with phosphates, but prompt treatment with diuretics was followed by urinary secretion. There was no retention of urine, it was a case of suppression, but whether reflex from the bladder, or hysterical in origin, it is difficult to say, in any case I cannot quote it under the head of hysteria.

I have seen similar results, after operations upon patients with enlarged prostates, or as a sequel to the crushing of a stone, and, in connection with prostatic enlargement, it has frequently been pointed out that, if the entire amount of residual urine is withdrawn in those cases where it is excessive, *i.e.*, 15 to 20 ozs., there is a very grave risk of suppression following.

In cases, of which I have notes, there was nothing in the character of the urine, or the condition of the patient to raise the slightest suspicion of trouble to come. The urine throughout was of good sp. gr. and free from pus, but this did not prevent an anuria, which was, in some instances, fatal through following closely on the track of some operative interference.

In comparing these cases with those already mentioned, it will at once appear obvious that there exists a profound and striking dissimilarity between the accredited causation of the anuria, occurring under the previous heading, and that at present under discussion.

In the former class, the reflex series, a rise of pressure in one renal pelvis, through some obscure and inexplicable nervous influence, was said to effect a cessation of function of the opposite organ ; here, on the contrary, the relief of obstruction, the removal of a blockage at the outlet of the urinary tract, is followed by the same result.

It will not be an easy matter to harmonise these two groups, and it is fairly obvious that the same explanation will not accord in both instances, but the comparison will serve to illustrate the complexity of the whole subject, and to bring to mind the numerous factors which must be taken into account in these instances of renal disturbance.

Let us now briefly consider some of the explanations offered for this curious state of affairs.

It has been suggested that, in all cases where suppression of urine has followed local interference with the urinary tract, disease of the kidneys has been present, and that the shock of the operation, or the anæsthetic, has been sufficient to determine a sudden stoppage in the secretory action.

It has, moreover, been said that upon a previous degenerate condition of the renal parenchyma there supervenes an acute nephritis with suppression.

There is, indeed, a certain amount of pathological evidence in support of these statements, for, as is well known, there are produced, in cases of long standing stricture, and especially in prostatic enlargement as the result of the obstruction, progressive degenerative changes in the renal substance.

A somewhat unmeaning term, surgical kidney, has been employed as denoting one particular variety of renal change, namely, pyelonephritis, but it cannot be too strongly urged that this is by no means the only form of degeneration found as a sequel to prolonged obstruction.

Such obstruction, lasting over a period of years, invariably precipitates that fibrotic process, which is an associate of the later years of life, and the occurrence of a septic condition of the bladder, which in turn leads to a suppurative change in the kidney, is only an incident. In nearly all cases of enlargement of the prostate, the urine will be found to have a low sp. gr., indicative of renal incompetence, and, in some cases, the state of the organ is one of advanced renal cirrhosis. But admitting all this, as on clinical and pathological grounds we are compelled to do, how is it that a surgical procedure, often a trivial one, can determine such a result as suppression?

Even if an acute nephritis is provoked, to what particular agent is it due?

If an anæsthetic has been employed, it is easy to cast all the blame on the drug, or, if the operation has been prolonged, to talk of post-operative shock. This does not bring us into any better position, for, although operative proceedings are not encouraged in patients whose kidneys are unsound, it is still occasionally necessary to undertake a surgical performance of

some magnitude in these subjects, with the most favourable results.

No ! these ideas are of no use to us. How, for example, will they explain the anuria which follows the withdrawal of residual urine from a post-prostated pouch, or that which occurs after the dilation of a stricture, when the most critical pathologist fails to detect any gross organic lesion in the kidneys ?

It has been said that sepsis has been introduced by the catheter, or that the urine, loaded with toxic products passing over a damaged surface, allows certain toxins to enter the circulation, and that these toxins, acting on already damaged kidneys, excite an acute nephritis.

This sounds a reasonable explanation, but the objections to it are strong. First, there is no definite relation between the amount of damage inflicted on the urinary tract and the development of anuria ; secondly, soft instruments, which are notoriously difficult to sterilise as compared with metal, rarely cause suppression ; thirdly, in only a certain number of cases is acute nephritis found ; fourthly, the rigors, which usually herald an attack of suppression, often come on so soon after instrumentation that there can hardly be time for absorption to take place.

Again, it has been urged that the kidneys have been working under pressure, with the ureters submerged beneath the residual urine in the bladder, and that the sudden relief, afforded by the withdrawal of the fluid, causes the vessels in the kidneys to give way, and that acute congestion of the organ results.

It has, indeed, been recorded in certain cases that, after residual urine had been drawn off, free hæmorrhage took place from the kidney. Personally, I have not come across a case of this sort, and, in certain instances of fatal anuria which I have followed out, there has been nothing in the urine to suggest an acute congestion.

Long ago, Fagge made the suggestion that œdema of the kidney was responsible for many changes in the activity of the organ, and he further stated that, so far as he knew, little attention had been paid to the matter. Certainly, œdema of the kidney is not an easy change to recognise post-mortem.

It is well known that, in the cranial cavity, the sudden removal of a large compressing agent may be followed by a condition of fatal œdema of the brain, though it must be allowed that some doubt exists as to the absolute asepticity of the wound in such cases.

The last theory is, that suppression is due to a nervous reflex, which causes inhibition of the renal secretory nerves, although I am unable to support my opinion by any experimental evidence, I am inclined to believe that some nervous influence is largely responsible for these cases of suppression, and I would urge, in support of it, first, the fact that the lower urinary tract is a continuation of the kidney ducts, and is intimately associated with these organs, both in development and nervous supply; secondly, that those operative conditions, which are most likely to influence the nerve centres, the withdrawal of a large quantity of fluid, are followed by the greatest disturbance, and we know how the withdrawal of fluid under pressure, in other regions of the body, often excites a reflex action; thirdly, that we already have proof of the influence of nervous control over renal secretion; fourthly, that these effects follow on the exciting cause so rapidly that there is no time for septic poisoning; fifthly, the sensitive temperament of the urinary tract, as compared with other parts of the body, and the relation of the various parts of it to one another, as shown in referred pain in renal calculus; sixthly, the fact that post-mortem examination of the kidneys in these fatal cases does not show advanced disease.

But, while I believe that a nervous impulse plays an important part, I cannot overlook the fact that, in some instances, definite inflammatory phenomena are present, though we cannot clearly trace the source of the infection.

Can nervous disturbance bring on an acute nephritis? Is it responsible for an œdema of the kidney?

At present our knowledge is so limited that no absolute answer can be given to these questions, and, while I uphold the influence of the nervous system, I do not seek to label it as the sole cause of these obscure phenomena.

In the explanation of disease, more factors than one, as a rule, are present, and it is not until these factors have

been carefully studied in relation to one another that any precise conclusions can be arrived at, but, if the nervous system can profoundly modify renal secretion when one organ is healthy, it is at least reasonable to suggest that, when some renal degeneration is present, these powers may be exaggerated.

It is, I know, the fashion in modern pathology to sniff contemptuously at the terms reflex and sympathetic, and, at a meeting last year when I explained a symptom by the suggestion that it was sympathetic, I was told that the phrase belonged to prehistoric days alone. At the same time, these practical people do not offer us much consolation or assistance for the loss of our ambiguous but comforting terms.

The mechanism of the body is so closely associated with nervous impulses in the actions of all its parts that we look at matters from a narrow standpoint, when we deliberately exclude a nervous factor in the production of disease.

As long as we accept the entity of angio-neurotic œdema, as long as we are conscious of the action of the salivary and gastric glands to reflex stimulation, so long must other nervous influences be acknowledged and confessed, and if this suppression is not partly reflex, I know not what it is.

DIAGNOSIS AND TREATMENT.

The recognition of calculous anuria in a typical case, and its separation from other forms of the disease is sufficiently simple ; for, given a history of calculous trouble and a sudden onset of suppression, coincident with renal colic, there being no obvious lesion of the lower genito-urinary tract and no evidence of acute nephritis, what other diagnosis can be considered ? Yet at times confusion may arise, and this will be in connection with those acute hæmatogenous infections of the kidney, usually by the B coli, to which I have referred to above. In that instance there was good reason to believe that a stone was present in the right kidney before the anuria, and, when this supervened, it was natural to conclude that the left ureter had become blocked by a descending stone.

In an excellent account of this acute suppurative state of the kidney, given by Mr. Barnard in the *Lancet*, October 28th,

1901, no case where suppression occurred is recorded, and in such cases where the disease is unilateral and anuria absent, a primary nephrectomy was attended by the happiest results.

Excluding this somewhat rare source of confusion, there remains another state which is liable to be overlooked. I would call this condition latent anuria. In these cases calculi may be present in both kidneys, and no obvious symptoms present, the urine is diminished and of low specific gravity. Suddenly suppression occurs, and, before the question of treatment can be fairly considered, the patient dies. I have notes of three such cases.

(1) A child, admitted with acute bronchopneumonia, died on the third day, no symptoms of renal disease having been noted. Autopsy disclosed stones in both kidneys and blocking both ureters.

(2) A patient was admitted with a large fixed mass in right renal region. The urine had sp. gr. 1015; there was no pus, albumin, or blood. Exploration revealed a mass which was thought to be malignant. No symptoms referable to left side. A week after operation—sudden suppression and death in 50 hours. Autopsy showed calculus embedded, a fibrous and disorganised right kidney, and calculi blocking the left ureter.

(3) Patient operated on for appendicitis, repeated attacks of pain referred to McBurney's point, tenderness, increase in pulse rate and elevation of temperature. No symptoms referable to kidney. Urine normal. Operation performed, removal of appendix, very little pathological change. Ten days after, sudden death; urine passed last five hours before death. Autopsy showed calculi blocking both ureters.

These three cases well emphasise, first, the danger of calculi which excite no symptoms; secondly; that, with advanced and pronounced renal incompetence, the ordinary examination of the urine is insufficient to detect disease; thirdly, the risk of mistaking a case of calculus in the ureter for appendicitis.

The explanation of the sudden fatal termination lies, I think, in the fact that, although a certain amount of urine was passed in these casee, latent anuria was present all the

time, and when the suppression became complete, disorganisation of the parenchyma was present, and the patient had no compensatory renal tissue upon which to draw. It shows also how advisable it is to have the total quantity of urine passed in the 24 hours collected as a routine, and not to trust to a chance specimen before deciding on diagnosis and operation.

Given a case where the diagnosis of calculus obstruction is simple, we have to consider whether there is any chance of the condition being relieved without operation, and, if so, for how long that treatment should be tried. No absolute rules can be given. for, as has been seen by the three cases recorded above, if renal inadequacy is present, death will probably take place in spite of treatment, operative or otherwise.

Assuming, however, as is the fact in the majority of cases, that the kidneys, or a kidney is fairly sound, three to four days may be spent in treatment which, while it has for its object the dislodgment of the stone, also prepares the patient for what is often a serious surgical undertaking.

Purging should be thorough and copious, the skin should be made to act freely, and opium and belladonna given in repeated and generous doses, so long as no toxic symptoms appear. Many cases of the successful expulsion of calculi from the urinary and biliary passages have been recorded after the free use of belladonna. In one instance, of which I have heard, heroic doses were given. 15m. 2 hrs.

Personally I should hesitate to use so dangerous a remedy quite so freely, but, if careful watch is kept on the patient, 5 to 7 m. may be given every two hours with safety. Should this line of treatment fail, as it will in the majority of cases, owing usually to the peculiar rough nature of the calculus, an operation must be performed. I have not as yet tried massage of the kidney and ureter, but, bearing in mind the peculiar friable nature of the concretions which were present in my two cases, and their small size, I cannot see any reason why this should not be gently undertaken. Unfortunately, the patients are generally so stout that it will be very difficult to perform.

Operative treatment has given some very satisfactory

results, and certainly shows a lower mortality than that obtained by waiting. Time will not permit me to enter fully into this matter, but I think that, in most cases, if the side last affected, can be ascertained, either by the history of the colic, or by the presence of rigidity, the incision had better be made in the loin. In a thin subject, or in a child, a transperitoneal operation is feasible, but, in a stout adult, I should imagine most unsatisfactory.

Should the stone not be found, or be in an inaccessible situation, nephrostomy, as suggested by Morris, should be performed, and, if the patient survives, another attempt to extract the stone may be made later. From the slight experience which I have had, and from cases related to me, I venture to doubt whether it is wise in these cases always to cut into the renal cortex. The hæmorrhage which comes from the engorged organ is truly alarming, and if our object is merely to form an opening for the escape of urine there can be no objection to an incision into the renal pelvis.

The other varieties of anuria may be considered collectively, and the diagnosis, with perhaps the exception of the hysterical form, requires no further comment.

The treatment, however, of the surgical forms of the disease may be taken from two points of view: first, prophylactic treatment, methods that may be adopted to minimise the chances of the supervention of suppression; secondly, the treatment of that suppression when it is once established.

The greatest attention should be paid to the preparation of all cases of stricture and enlarged prostate before any operative procedure; every effort should be made to improve the condition of the kidneys by drugs and dieting, and the vicarious action of the skin and bowels in carrying off the excretions encouraged to the fullest extent. Warmth and quiet are absolute essentials.

Of drugs, I consider digitalis and urotropin exceedingly valuable, and, for diet, milk with a fair amount of diluent drink, such as barley water and linseed tea. It has been argued that diuretics should be prohibited, as tending to overstrain the damaged kidneys. I cannot hold with that view, especially if the diuretics are harmless and sedative as barley water and linseed tea. As a rule, in the damaged

kidney there is no difficulty in the watery element of the urine making its exit, the trouble is with the urea and the extractives; dilution will tend to assist the kidney in getting rid of them, and a certain increase in the fluid of the blood will favour diaphoresis and free purgation.

Now it is a natural corollary to all these precautions that, if renal inadequacy is recognised, operative treatment, since it is likely to precipitate an anuria, should be condemned.

Theoretically this may be so, but in practice it is necessary to bear in mind that the cause of the renal disease, if left alone, will itself shortly bring about a fatal issue; in other words, that stricture and enlarged prostate, if not relieved, will end in death. It is not always possible to form an opinion upon examination of the urine, or as to the patient's chances of surviving an operation. In the case of the bus driver, in which an acute suppression supervened, the urine was fairly normal before operation, and operation in his case was imperative.

So, too, in prostatic enlargement, anuria and death sometimes follow the passage of a catheter, while, in another similar case, a prostatectomy is satisfactorily accomplished. The risks of the operation must be weighed against the risks attendant on the condition, and, broadly speaking, where the renal inadequacy is marked, after all due care in preparation, the mildest operative procedure, compatible with adequate treatment, alone should be adopted. Where there is a large amount of residual urine, the whole quantity should not be withdrawn at once, or if this is done a quantity of boracic-acid solution, 5 to 10 ozs., should be left in its place.

When once anuria threatens or has occurred, treatment, vigorous and thorough, must be conducted on the same well-known lines as in the suppression of acute Bright's disease. Hot packs—free purging—as a basis, but with drugs, digitalis and strychnine, and dry cupping over the loins. Of digitalis, I have the highest opinion, and a curious case was recorded by Clark, in the *Boston Med. and Surg. Journ.*, in which suppression yielded to the external application of digitalis.

Cupping also is of the greatest service. It probably acts by depleting an engorged kidney by means of the communication

between the renal and lumbar vessels, and is at least a valuable and simple remedy worthy of application. I know of several cases in which threatened anuria was arrested, and I am convinced that the cupping was a valuable agent in effecting a cure.

Pilocarpin I distrust, and I have not found it successful in those cases in which I have employed it. Its depressant action on the heart is a strong point against it.

Saline transfusion into the vein is another form of treatment which should be tried, and in fat, plethoric people it may be combined with blood letting. It acts apparently by diluting any toxic matter, and flushing out the renal vessels: the success, which often attends its employment, is a further argument in favour of fluid diuretics.

As to the treatment of lumbar incision and splitting the renal capsule, or even the renal substance, I have little to say. It has been practised with some success in post-operative anuria, and in some cases of suppression in Bright's disease. If we could be certain of the exact pathological change which leads up to this dangerous crisis, we should be better able to select the appropriate remedy. Capsule splitting can only be supported on the grounds that increase in the renal tension is alone responsible for the anuria, and there is no reason to believe that this is the case in many instances of suppression.

PLATE XIV.

1. 2. 3.

Case of Peculiar Gait.

Photograph showing the different stages of the stumbling movements.

DEMONSTRATIONS ON DISEASES OF THE NERVOUS SYSTEM.[1]

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I.

CASE OF PECULIAR GAIT.

[With Plate XIV.]

THE patient, a man aged 58, has a serious difficulty in walking.

As he walks across the room his knees keep suddenly giving way, so that his gait resolves itself into a series of stumbles, and he looks as if he was about to fall at almost every step, although he actually does so very seldom indeed. What strikes one, on looking carefully at the stumbling movement, is that it is executed rather more regularly and smoothly than one might expect if it arose from any local trouble in the legs, and the right leg, as a rule, gives rather more than the left. Another point to be noticed is the intermittence of the affection. It is not always there, and sometimes, more often in the mornings, he walks for an hour or so without any trouble, but, as soon as he has been about for any length of time, it comes on, and apparently lasts, with slight intermissions, all day. The first time he came to the hospital he was walking well, and from the tremor and somewhat rigid appearance that he has, he was thought to be an ordinary case of paralysis agitans. He complains also of tinglings and numbness in the limbs, but possibly these are not directly connected with the source of the difficulty in walking. The question naturally arises as to the origin of this peculiar gait, which we may, for the present, speak of as an intermittent limping, using the word in its widest sense, and not in connection with any particular group of cases.

First, we may consider whether it comes in the group generally spoken of as intermittent claudication, the symptoms of which are characterised by sudden attacks of lameness, often accompanied by cramp, blueness of the extremities, and vague tingling sensations, and thought to be dependent on vasomotor disturbances. The usual complaint is weakness,

[1] From the Out-Patient Department of the Middlesex Hospital.

pain, and cramp in the legs after walking some distance, and a consequent necessity of resting for a time until the symptoms pass off, while, on the sensory side, there are generally tingling, coldness, and numbness experienced, as complained of by this man.

The anatomical condition most commonly associated with this group of cases is that of arterial degeneration, and the idea is that atheromatous and sclerotic changes in the arteries of the limbs produce alteration in the nutrition of the muscles. Arterial pulsation in the foot has often been absent in such cases, and in some instances the condition has been associated with gangrene. Some people, however, think that the vascular changes, giving rise to such symptoms, are more likely to be in the cord, or the brain, than in the legs.

So far as intermittence goes, the trouble in this patient corresponds to this description, for at times, especially after a long rest, his difficulty disappears, but in other respects the similarity is not so close, for he is not pulled up sharply with a cramp, or a jerk, but the knees seem to give way in a limp manner, and, as the stumble occurs, the head is always turned to one side, usually towards the right shoulder, and there is a monotony about the proceeding which is not altogether suggestive of accidental vascular changes. Moreover, a temporary rest does not always improve matters, and, beyond a very moderate degree of uniform thickening of the arteries, no vascular change can be found.

Another form of difficulty of walking, and sometimes even of standing, is described under the title of Astasia-Abasia. It is usually associated with hysteria, and is characterised by a partial or complete inability to stand or walk, although there is, apparently, no loss of power of the independent movements of the limbs when the patient is in the recumbent position, but the symptoms now under consideration cannot be included under this title. A descriptive term of "stuttering" of the legs has been applied to some cases in which the gait is of a hesitating character, and is due to functional disturbance. We have seen that there is no evidence of atheroma, or arterial spasm from other causes in the legs, and that there are no signs of any lesion of the spinal cord; and we therefore fall back on some disorder of the brain, which we already believe to account for the existing tremors.

Sir William Gowers (*Manual on Diseases of the Nervous System*, Vol. I., p. 341) mentions instances of the association of intermitting lameness with intermitting difficulty of reading (dyslexia), which together are of serious import, inasmuch as they indicate advanced arterial degeneration ; but the absence of arterial degeneration enables us to exclude our case from this group. It may, of course, be possible to have arterial spasm of cerebral arteries apart from any gross change in their walls ; but opinion is at present not decided on the question of vasomotor variations in the cerebral vessels, and, as it does not seem to be a likely possibility here, the matter need not be further discussed. The question of hysteria, I think, can be dismissed ; but other functional causes still remain to be considered, especially the tics, and, on the whole, it is in this group that the case seems to fall. The tics are characterised by sudden jerky, spasmodic movements, which were formerly confused with the movements of chorea, and it is still difficult to classify satisfactorily their different varieties.

Where the sudden movements, as blinking, or sudden twitches of the face or head, are limited in distribution, the term "simple tic" is usually applied, but where several groups of muscles are involved, the movements become much more complex, and are then generally spoken of as "co-ordinate tics," while, in other instances, the movements are still further complicated by involuntary utterances of words and sounds. This case would seem to fall best into the group of co-ordinated tics, characterised by the performance of complex movements, which are repeated, time after time, without any obvious use or cause, but often with occasional intervals of complete cessation. The movements have not the irregularity of those of chorea, but rather represent voluntary movements, which might be useful in their proper place, but which have got entirely out of hand, and are reproduced without cause, and cannot, except temporarily and with great effort, that quickly fails, be voluntarily controlled. The outlook, so far as recovery is concerned, is not good ; and one can only hope that the periods of intermittence may lengthen ; but the case is of great practical interest from the point of view of diagnosis.

RECURRENT SWELLING OF THE DORSUM OF THE HAND ASSOCIATED WITH THE APPEARANCE OF BRUISING FOLLOWING A BLOW.

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Amongst varieties of swelling of the skin of an obscure nature, the so-called hysterical œdema-holds an interesting place. That localised exudation of fluid should be determined by the nervous system is remarkable, but the exudation of red-blood corpuscles under the same influence would seem to be more difficult of explanation. In the following case, swelling and bruising of the dorsum of the hand followed a blow, and, for several years afterwards, swelling and bruising recurred at the same spot. In July 1898, a girl, aged 13 years, was seen by me at the Bristol Children's Hospital, where her mother gave the following history: — Eighteen months' before, while the child's left hand was upon the edge of a desk, it was struck, but apparently not with any great force, with a wooden pointer, by a somewhat irritated teacher. Localised swelling and bruising appeared over the back of the hand during the same afternoon, and remained for eight weeks. The persistence of the swelling caused the parents to be annoyed with the teacher, who, however, expressed great regret for the injury, which, there can be little doubt, was a very misleading indication of the force of the blow. Although the swelling lasted a long time it was apparently forgotten when once it had disappeared, yet, curiously enough, six or seven months later, not only the swelling but a bruise-like patch returned. After remaining, as before, for a few weeks, the swelling and discoloration of the skin disappeared, but it was not long before they once more returned. The girl was then taken to the Bristol Children's Hospital, where she was seen by me. Some swelling was present, mainly over the radial half of the dorsum of the left hand, and in the centre of the swelling was a bruise-like patch of definite hæmorrhage into the skin measuring about

two inches across. The accompanying sketch gives some idea of the situation and size of the hæmorrhage. The girl was seen several times during a few weeks. Attacks of

Situation of the bruise-like area on the dorsum of the left hand.

pain were complained of, and, after every attack, there was temporarily increased swelling associated with some redness of the skin, which redness was followed by the appearance of bruising. There was tenderness to the touch over the swollen area, but no pitting on pressure. The girl described her hand as feeling "cold and dead," but my notes do not mention that any anæsthesia was noticed. The swelling remained for three months, and, after its disappearance, the girl was not again seen for seven months, at the expiration of which time she again visited the hospital with a return of the swelling. As on former occasions, a discoloured bruise-like patch was present, which remained a few weeks.

In 1905, the girl was visited at her home in order to ascertain the subsequent history of the swelling. She was then—more than seven years after the onset of the trouble—a tall, bright intelligent girl, of 20 years of age, who had herself become a school teacher. The swelling was said still to make its appearance two or three times a year. Pain preceded the onset of the swelling, frequently recurred during the time the swelling lasted, and was said to be felt, not only in the affected part, but above the clavicle and down the inner side of the arm and forearm. During the time that the swelling of the hand was present, there was tenderness of the vertex of the scalp. She stated also that sometimes the index and middle finger of the affected hand would become semiflexed and rigid.

If the circumstances, in which the swelling appeared and its curious recurrence, should not be considered to be sufficient evidence of nervous origin, the hyperæsthesia of the vertex of the scalp, and the contraction of the fingers would seem to leave little doubt that the affection was of hysterical nature.

Charcot in his clinical lectures records a somewhat similar case of swelling of the hand following a blow. A girl, aged 18, while carrying faggots along a path of hardened snow, slipped and fell, and the bundle of wood struck the back of one of her hands. Swelling appeared at the point struck and lasted over a year. In the same lecture, it may be interesting to mention in passing, an illustration is given of a hand in which swelling has been produced by hypnotic suggestion. In the above case described by Charcot, in which persistent swelling followed a blow, there was no appearance of bruising, but one of my surgical colleagues, Mr. C. A. Morton, once told me that he had met with a case that resembled my own in the presence of recurrent cutaneous hæmorrhage. A girl, aged 12 or 13 years, who had come under his notice, used to suffer from severe attacks of pain in one hand, followed by swelling and the appearance of bruising. The first attack had followed immediately upon a blow.

The presence of cutaneous hæmorrhage seems to me to be the chief feature of interest in this case; other instances of hysterical swelling are less uncommon. I have met with three or four cases of swelling of the hand in children, without hæmorrhage, which probably were of nervous origin. Such a case as follows is an example. A girl, age 11 years, suffering from very great swelling of the fingers and dorsum of the left hand, visited the Bristol Children's Hospital. The swelling did not pit on pressure. At the time, unfortunately, it did not occur to me to test for abnormality of sensation, but the history is suggestive of a nervous causation. When the girl was seen there had been three attacks of swelling of the hand of sudden onset, the swelling lasting, in every instance, for two or three weeks. On writing to the mother two years later, I learnt that the attacks of swelling still occurred, and that since I had seen the girl, the swelling had also affected the left leg. Half an hour before the swelling occurred, the girl knew, by tingling

sensations in the hand and arm, that the swelling was going to appear, but perhaps the most noteworthy detail of information was, in the words of the mother, "that there is always weakness in the hand and leg, in fact she cannot do anything with the left hand. If she were to attempt to pick anything up she would drop it." Since receiving this letter, another has been written to me by the girl's mother, which informs me that a more recent attack commenced with severe pain in the affected limbs. It seems highly probable that this experience of pain has been the outcome of suggestion, since, in the letter which was first sent by me to the mother, I asked if the girl ever complained of pain, but, as has been mentioned above, the reply was that the girl was accustomed to speak of tingling sensations, but not of pain, at the time of onset of the swelling.

Although the second case is with little doubt an example of swelling of nervous origin, it perhaps, presents nothing especially noteworthy, apart from the fact that it occurred at rather an early age, and this has been my main reason for mentioning it in association with the case in which hæmorrhage of nervous origin, into the skin, was present in a young girl.

SERUM-THERAPY.

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More than ten years have elapsed since the publication of Von Behring's discovery of the antitoxins to the poisons of diphtheria and tetanus, which laid the foundation for our present knowledge of serum-therapy and so profoundly modified our ideas on the subject of immunity. The object of this paper is to outline in brief the advances that have been made up to the present time in the therapeutic application of immune sera to disease in man, the reasons for the failures that must be recorded, and to indicate the hopes for the future. The subject is of especial interest at the present day whilst the brilliant application of the method of specific vaccination on scientific principles, which was introduced by Sir A. E. Wright, is attracting so much attention, and the question whether a serum or a vaccine is indicated in a given case of infective disease is constantly presenting itself; in other words, whether we are to immunise a patient passively by means of protective substances elaborated in a living animal, or actively by means of a specific vaccine introduced into his own tissues. It is impossible within the limits of this article even to refer to all the attempts that have been made in the serum-therapy of various diseases, and no reference will be made to those that are not of theoretical interest, or which do not give hopes of future usefulness.

The value of *diphtheria antitoxin* is now more firmly established than ever, and the effect of a ten-year trial of this serum in hundreds of thousands of patients has been to demonstrate it to be a specific remedy comparable with mercury or quinine. It is hardly necessary at the present day to bring forth a large amount of statistical and clinical evidence to clinch this point: it was dealt with in full by Dr. Foord Caiger in the very interesting, though somewhat desultory, discussion on serum-therapy recently held under the auspices of the Chelsea Clinical Society.[1] Dr. Caiger showed that the average case-mortality of diphtheria in the

hospitals of the Metropolitan Asylums Board had fallen from above 30 per cent. to less than 10 per cent. since the introduction of antitoxin. During this period from 60 to 70 thousand patients had been treated, from which it follows that the use of antitoxin has been the means of preserving the lives of some 12,000 persons. When we add to these the number of lives saved in the other hospitals and in private practice, and consider the economic value of these lives, we shall realise the enormous importance to the community of the discovery of antitoxin. The well-known and fully appreciated necessity for the early use of the serum was still further established by the figures published by Dr. MacCombie, in an analysis of 5,300 consecutive attacks. In cases treated on the first day, the mortality was nil; on the second, 4·5 per cent.; on the third, 11·9 per cent.; on the fourth, 17·5 per cent.; and on the fifth, or later, 18·9 per cent.

As regards *dosage*, there is still no definite rule that can be laid down. The practice recommended by Dr. Caiger is the injection of six or eight thousand units at once, following it by a second injection at the end of twelve or twenty-four hours, and continuing the treatment until the membrane shows signs of separating. This method has been adopted as the result of much clinical experience, and may probably be taken as being the best, but it must not be forgotten that no harm (other than the "serum disease," to be discussed subsequently) has been found to result from larger doses, and that it is probable that a great excess of antitoxin is able, in certain circumstances at least, to attract toxin which has already combined with cells, and thus may do good when smaller doses may fail. The question of dosage, however, cannot be settled by a mere appeal to theory, since the facts even of this, the simplest application of serum-therapy, are extremely complicated and not yet fully understood; and clinical findings must far outweigh theoretical considerations. Thus, if antitoxin cannot attract toxin from the cells, and if Ehrlich's theory of the interaction of toxin and antitoxin is true, we should expect that a comparatively small dose of serum would suffice: for it is highly improbable that there is a very large amount of free toxin present in the blood at a given time, and Ehrlich believes that the two substances have powerful

affinity the one for the other. If, on the other hand, we admit Arrhenius' and Madsen's views on the subject, the dose of antitoxin should be as great as possible, since, according to them, the toxin is never completely neutralised, even although its antitoxin is present in great excess. The question of intravenous injection must also be left open until further clinical experience has been acquired, though here theoretical considerations should be allowed some weight, since it seems clear that the sooner the antitoxin reaches the blood-stream the better, whatever theory of its action we may hold. The process is an easy one, and hardly more formidable than the administration by the ordinary method, and, unless definite clinical evidence against its utility is forthcoming, should be used for the first injection in all very severe cases.*

The only new development in connection with the serum treatment of diphtheria is the introduction of a bacteriolytic serum whereby the bacilli may be destroyed in the local lesion: the antitoxin, it need hardly be pointed out, acts only on the toxin, and the bacteria which produce it have to be dealt with by the leucocytes, or are destroyed by the bacteriolytic action of the body-fluids. This serum was first prepared by Baudi,[2] who reported clinical success from its use, though only on a small scale, and other experimenters have thought they have obtained good results. But Rist[3] failed to obtain a serum of any value, or even to immune animals against the bodies of the bacilli, and Lipstein,[4] although he succeeded in the latter respect (by injecting mixtures of the bacilli and large doses of antitoxin into the peritoneum), apparently did not obtain a bacteriolytic serum of any potency, and was unable to confer passive immunity. In one respect his results are extremely interesting. He found that the serum of animals treated in this way are strongly agglutinating (ordinary diphtheria anti-

* The following method may be used:—Prepare the skin over the bend of the elbow, and apply a firm ligature round the forearm, so as to distend the veins below it. Suck the serum into an all-glass syringe, which has been sterilised by boiling, and push the point of the needle obliquely through the skin into a prominent vein; when this has been entered the blood will rise in the syringe, pushing the piston before it. When the blood appears in the syringe, showing that the vein has been reached, remove the ligature and inject the serum *slowly* into the vein, taking care that no air enters. When sufficient has been injected, withdraw the syringe and apply a pad of collodion and sterilised wool.

toxin, which is obtained by the injection of the toxin only, not the bodies of the bacilli, is powerless in this respect), and that it only clumps bacilli of the culture used for the injection. Now the diphtheria bacillis has always been looked upon as a very definite bacterial species, and, so far as is known, an antitoxin prepared by the injection of one toxin will neutralise toxins formed by all other cultures. But it appears from this that bacilli which form identical toxins may contain very different substances in their protoplasm. The subject is of no practical importance at the present time, but the renewed interest that is being taken in the subject of endotoxins at the present time may bring about results of value in the future.

With regard to the practical value of *tetanus antitoxin* there is little to add to the conclusions arrived at by Kanthack soon after the substance was first introduced: in acute tetanus it is of but little value, whereas in chronic tetanus it is of very great benefit in affording relief to the distressing symptoms and in distinctly improving the chance of recovery. Statistics which are of scientific value are not forthcoming, but the truth of these statements will be readily admitted by all who have seen a few cases of the disease. It frequently happens that the improvement which follows on each injection is so marked and so greatly appreciated by the patient that it carries more conviction to the medical man than thousands of tabulated cases.

The dosage of tetanus antitoxin is simple: large doses are required, and they should be repeated whenever their effect goes off, or, if there is no obvious effect, within a few hours.* The best site of administration is not so well established. There are six possibilities—(1) subcutaneous, (2) intravenous, (3) intracerebral, (4) intraspinal, injection, (5) application to the nerve leading to the wound, and (6) local application. In the chronic cases subcutaneous injection will be adequate, though even here the advisability of giving the first injection intravenously may be considered; there is not nearly so much experimental evidence in its favour as in the case of diphtheria, since the toxin only circulates in the blood to a very limited extent. The intracerebral injection has more to recommend it on theoretical grounds, and striking

* Most of the tetanus antitoxin sold in this country is unstandardised; the average dose may be taken as 10 c.c., but more may be given.

results have been obtained in a few cases of very severe acute tetanus, when the prognosis, if any other treatment had been adopted, would have been almost hopeless. The method is as follows :—The scalp is prepared in the ordinary way, and a small flap raised a short distance to one side of the median line and anterior to the fronto-parietal suture. A small trephine hole is made through the skull in this region, or it may be simply drilled, and a long needle is inserted and pushed in the direction of the foramen magnum until the lateral ventricle is reached ; when this happens the cerebro-spinal fluid will escape through the needle. The syringe (containing 10 c.c. or more of antitoxin) is now attached, and the serum injected. The intraspinal injection has less to recommend it on theoretical grounds, and it would appear more dangerous, although I am not aware that any serious results have been recorded. The needle is inserted between the sixth and seventh cervical vertebræ, and 20 to 30 minims of antitoxin are injected into the substance of the cord. The injection of serum into the spinal canal in the lumbar region has also been practised, and is a simple operation, but it is not probable that it has any advantages over the subcutaneous route.

The application of the antitoxin to the wound is unadvisable if reliance is to be placed on it alone, and if no serious attempt is made previously to remove or disinfect the area in which the bacilli are present and are elaborating their toxins. It is obviously hopeless to apply it to a large wound which discharges copiously and swarms with saprophytic organisms of all kinds, and to expect is to make its way to the bacilli lying within the tissues. If the wound is scraped it is certainly justifiable and advisable to apply antitoxin locally before the dressings, and local injections may also be made.

The reason for the application of antitoxin to the nerves supplying the region of the wound (recommended by Ransom and Meyer) will be discussed subsequently. The nerves are to be exposed as near the body as possible and infiltrated with antitoxin by means of a hypodermic syringe.

Our knowledge of the reason why tetanus antitoxin is of far less clinical value than diphtheria antitoxin is now established on a firm basis. It must be realised that the former substance (as tested by its power of neutralising toxin) is even more potent than the latter, and yet its application is

disappointing, although it is probably of more use than any other therapeutic agent. The reason for this clinical failure is that the toxin possesses a very great degree of affinity for the nervous elements, disappearing from the blood within a few minutes of injection.

Further, both of the rival schools (that of Ehrlich on the one hand, and that of Arrhenius and Madsen on the other) agree that tetanus antitoxin and toxin possess but little affinity the one for the other, and take a considerable time to combine together. The pathology of tetanus is very different from that of the other bacterial diseases, except perhaps in that of rabies. In other diseases we have every reason to believe that the pathogenic microbe elaborates its toxin locally, and that this substance then exerts its local action, passes into the blood or lymph, and thus poisons the body generally.

The experiments of Marie,[5] Morax,[6] Ransom,[7] Meyer, and others have shown that in tetanus the toxin acts solely, or practically so, on the central nervous system, and that it reaches that structure by ascending the nerves, and not by traversing the blood-stream. Thus when toxin is injected into the blood-stream it first enters the nervous system by the peripheral terminations of the nerves, disappearing from the circulation in the course of a few minutes, and then slowly ascends the nerve trunk until the brain or cord is reached. This is a somewhat slow process, though the exact rapidity with which the toxin passes has not been ascertained, and explains the shortness of the incubation period which is observed after wounds on the face as compared with those of distant regions. The incubation period between the direct application of the toxin to a nerve-cell and the appearance of symptoms is very short. The toxin appears to choose mainly the motor nerves, and, in the horse at least, the masseteric nerve is apparently especially liable to be affected ; the bearing of this on the development of trismus is obvious.

The toxin does not, so far as can be ascertained, ascend the nerves in the lymphatic spaces, but is actually transmitted along the axis cylinder, and during its transmission (and herein depends the clinical importance of these observations) is apparently shielded from the action of antitoxin circulating in the blood, unless indeed this antitoxin is present in very large amounts. Thus an animal may be immunised by means

of antitoxin against several lethal doses of tetanus toxin, but will nevertheless contract the disease if a small amount of toxin is injected directly into the nerve.

The prophylactic use of tetanus antitoxin is not sufficiently understood. The disease is a comparatively rare one in this country, and it would be obviously impossible to inject all patients suffering from slight wounds, even although an absolute assurance could be given that all danger of tetanus is thereby eliminated. But all suspicious wounds might well be examined for bacilli having the well-known morphological appearance of those of tetanus. This examination is quickly carried out and requires but a small amount of skill, and the results, though certainly not absolute, would permit an early diagnosis in a fair percentage of cases. In the absence of such an examination, a prophylactic injection should be given to patients suffering from those wounds, which clinical experience shows will in all probability be followed by tetanus. The dose required is a very small one (1 c.c. of a potent serum is probably sufficient), and the protection is almost absolute.

We now pass on to curative sera which have a different mode of action, *i.e.*, those which are in the main or entirely bacteriolytic, dissolving the bacteria in the blood or tissues by their direct action and without the intervention of the leucocytes and without any antitoxic action that has been demonstrated.

The most important example is the *antistreptococcic serum*: a full study of this substance would occupy too much space, and would not yield any useful results. The truth is that the use and method of preparation of anti-streptococcic sera are entirely empirical, and that we do not even know with certainty the method in which it acts, although analogy would lead us to believe that the serum is mainly bacteriolytic. Even this is uncertain, for the streptococcus pyogenes does elaborate a substance, the streptocolysin of Besredka,[2] which in some respects acts like a bacterial toxin, although, according to Besredka, its toxic action is nil. There are, however, reasons for thinking that the production of this substance does take place *in vivo*, and that the consequent blood-destruction may play a part of some importance in the pathology of streptococcic infections. These are (1) the well-known fact that anæmia of rapid development, and often of high grade, is a very common

symptom of septic diseases, and (so far as my experience goes) is especially marked in streptococcic as opposed to staphylococcic infections. Hayem has estimated the average loss of red corpuscles in septic fever at 200,000 to 1,000,000 per week, but it may be very much greater than this. (2) Breton [9] has shown reason for believing that it is possible to demonstrate the presence of streptocolysin in the serum of rabbits which have been injected with virulent streptococci, and even succeeded in producing an anti-hæmolytic serum by the injection of the serum of these infected animals into healthy ones. (3) Schlesinger [10] found that the production of this hæmolysin might be taken as an index of the virulence of the steptococcus. Of nine non-virulent cultures, only one produced a hæmolysin, whereas four cultures from cases of septicæmia all produced it.

In ordinary circumstances, we should not expect to see clinical evidence of blood-destruction following slight streptococcic infections, for human blood normally contains an antilysin which inhibits the action of this substance, and blood-destruction on a large scale could only result from a very potent infection with a vigorous culture. It is just in such circumstances that antistreptococcus serum often does good, and it is at least possible that some of the benefit may be due to the neutralisation of this streptocolysin. This, however, is but theory, and I am not aware that any of the numerous brands of antistreptococcus serum which are sold have been shown to have this action.

The empirical nature of the serum is well shown by the different methods which are used in different laboratories for its preparation. Some use for their injections cultures which have been artificially immunised by repeated passage through rabbits (Marmorek, Aronson), others, such as Javel, Moser, and Menzer, avoid this, and use streptococci direct from cases of human disease. Some sera are univalent, being produced by the injection of a single strain of the organism, others ("polyvalent" sera) are obtained by the injection of several strains in succession. Further, there is no agreement as to the spacing of the doses of these or the amounts to be given in each, and, more important than all, many, if not most, of the sera issued commercially are apparently not standardised in any way, so that it is possible, as Sir A. E. Wright pointed out in the debate referred to above, that the serum may in

some cases be inert, and in others may actually contain toxins or other harmful substances.

In such circumstances, clinical experience forms the only guide, and here there is no decided consensus of opinion. Negative results are only too common, and the succession of two or three cases, in which no benefit seems to ensue, lead many to the opinion that "antistreptococcic serum is no use." This I believe to be entirely erroneous, and when we consider the possible causes of uselessness of the serum, it will be clear that a few definitely positive results will outweigh many negative ones. These positive cases are not uncommon, and in many of them the improvement which follows each injection is quite definite, and succeeds the administration of the serum with such certainty and regularity as to leave no doubt as to the relationship of cause and effect.

The cases in which the serum fails may be grouped under three heads :—(1) Those in which the serum was inert ; (2) those in which the disease was not actually due to a streptococcus at all, and a study of the literature of the subject will show that in many cases it has been given without a bacteriological examination and the demonstration of the presence of the streptococcus, although that would appear to be the most obvious preliminary to the use of the serum ; and (3) those in which the serum was not homologous to the streptococcus in the particular infection. The question of the unity or multiplicity of the streptococci need not be discussed here. It is a difficult subject, and is largely a matter of nomenclature, there being no accepted criterion of what constitutes a bacterial species. It has, moreover, but little practical value at present, since it is quite certain that one strain of streptococcus may alter from time to time in pathogenic and chemical properties. Even if we could classify the streptococci into different species, we should not be certain that a serum prepared against one of these would be potent against all infections caused by it when its properties were modified. (4) The dose may be incorrect, either too small, or, possibly, too large.

If the mode of preparation of the serum is empirical, its method of administration must be empirical also. With regard to the serum to be selected, most practitioners will choose a polyvalent variety in the first instance, though it is very

doubtful whether its use presents any definite advantages. But if no decided results follow the first injection, it is highly desirable that the brand should be changed, and the second dose should be of serum derived from a fresh source. In judging the advisability of this the temperature is the safest guide. If it falls, the result in all probability of an antitoxic action, and especially if the fall is accompanied by a decided amelioration of the symptoms, the use of the serum may be continued. In other cases each injection may be followed by a definite rise: here also I believe that benefit is likely to ensue, and the use of the remedy may be continued, especially if, as often happens, the rise of temperature is but transitory and is followed by clinical signs of improvement. If the temperature shows no signs of change the serum should be changed, and, if it is so irregular that no alteration can be traced, reliance will have to be placed on other and less definite signs.

The cause of this occasional rise of temperature is of some importance and interest, and bears directly on the question of the use of the serum in contradistinction to the vaccine treatment. There are two views. Wright [11] has suggested that the serum may contain free toxin and may really be a bacterial vaccine in disguise. If this is the case it is obvious that the usual blind-fold administration of the serum may be a source of great danger, and, if the treatment is to be adopted at all, the doses must be carefully regulated by the opsonic index, or by such other means as the future may show, and that it will only yield results that could be obtained more safely and certainly, if also less easily, by means of vaccines prepared on Wright's method. The other explanation appears to me to be the more likely. It is that the serum is really acting in the way it is intended to do, and is dissolving the streptococci, either by its action as a bacteriolysin or indirectly by an opsonic action, or by stimulating phagocytosis; and that the toxin is set free, and causes the rise of temperature. This has been shown to occur in the case of B. typhosus by Pfeiffer, who demonstrated that the injection of a bacteriolytic serum along with a large dose of bacilli may add to the danger, and kill the animal by the toxin set free when the bacteria are dissolved. If this is the explanation the rise of temperature would not contra-indicate the further use of the serum, though it might suggest a certain amount of caution in the size of the

dose. I imagine that most specimens of serum are tested for freedom from toxins by the injection of large quantities into suitable small animals before being issued for use, but of course the practitioner has no assurance that this has been done.

Further, I am not aware that any danger to life has resulted from this exacerbation of the symptoms, and, this being so, should continue to use the serum in such a case, although, when a culture of the infective organism has been obtained, it would be always well to estimate the opsonic index frequently during the treatment, and to commence at once to prepare a vaccine.

In most cases practitioners will continue to rely on the use of the serum rather than that of the bacterial vaccines. The administration of the serum requires no skill, whereas the preparation and administration of the vaccine, including a frequent estimation of the opsonic index, require a very considerable amount of experience, and are tedious processes; the treatment can only be carried out by a well-trained pathologist. The serum treatment can be administered at once, whereas there is a necessary delay of two or three days, if cultures are to be obtained and vaccines prepared therefrom. At the same time the treatment should always be borne in mind in chronic infections, since striking results have been obtained in such serious affections as ulcerative endocarditis, and cultures of the streptococcus should always be obtained, so that Wright's treatment may be employed if the administration of serum fails.

(*To be continued.*)

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SOME CLINICAL FEATURES OF COLICA MUCOSA.

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Owing to the conflicting ideas which prevail as to the precise nature of this malady, its position is ill-defined in the list of abdominal diseases.

By some authorities, it is deemed a phase of genuine enteritis; by others, such as Nothnagel, it is looked upon as a non-inflammatory phase of mucous colitis; by others again, as Westphalm, as part of a genuine catarrh. The point turns on whether it is an organic disease of the large bowel; a catarrh or inflammation, or a neurosis. The consensus of opinion would appear to flow in the direction of regarding it, not as an inflammatory condition at all, but as a secretory, motor, and sensory neurosis.

The reasons given for so regarding it may be summarised thus:—

A. It occurs chiefly in neurotic subjects, and hence perhaps we can explain its greater prevalence in women.

B. There is almost invariably a history of constipation, for which their sedentary life often predisposes women.

C. There is, as a rule, an absence of pyrexia during the acute phase of the attack.

D. There is, in the majority of cases, a definite history of antecedent digestive disturbance.

E. It may follow an attack of influenza, in which abdominal symptoms have been the chief feature.

Causation.—The disease occurs mostly among women from 20 to 50 years of age, but it may occur later. As already indicated, those of neurotic temperament seem specially predisposed. As the precise nature of the malady is more clearly recognised, it will be found to be frequently associated with or follow after influenza, and the point as to whether or no diseases of this type cause mal-secretion of intestinal as well as other mucus is worth investigation.

There are five fairly constant features :—

A. A neurotic diathesis.
B. A history of constipation.
C. Pain of a colicky nature.
D. Mucous evacuation.
E. Anæmia.

A knowledge of the precise rôle played by the two evidently causative agents, the neurotic taint and the constipation, would materially elucidate the problem.

Constipation, as is well known, is a fairly constant feature in neurasthenia. A continuous result of accumulated fæcal matter, in a convenient situation like the sigmoid flexure, might easily enough lead to an absorption of toxin, a fact which, in itself, would explain the associated anæmia. Locally, a paresis of the muscularis of the colon might be induced with consequent increased stasis of fæcal contents of the bowel. This, in turn, would lead to the establishment and appearance of chemical changes, which might *per se* act as sources of the pain, or interfere, by their presence, with the normal decomposition and disintegration of mucus physiologically formed. Hyper-secretion or mal-secretion of mucus might thus be produced through the agency of the sympathetic on tissues analogous to formation of sugar, etc.

Thus perhaps, in three ways, the quantity and consistency of the mucus might be explained :—

(*a*) Hyper-secretion.
(*b*) Mal-secretion.
(*c*) Normal secretion, not allowed to become decomposed.

The subsequent consistency may depend on a reabsorption of mucus :—

(*a*) Formed in normal, or physiological quantity not decomposed.
(*b*) Excessive secretion partially reabsorbed.
(*c*) Not reabsorbed and evacuated in a thin transparent consistency.

The pain invariably associated with the mucus may be caused :—

1. By the formation of abnormal chemical agents, which act as irritants *per se* in the bowel, or change the character of the mucus into one of an irritating nature.

2. By the variable degree of adhesion of mucus to the mucosa, and the contractions set up in the course of separation and expulsion, the variability and intensity of the pain would, of course, depend largely on the tenacity of the mucus, and the degree of its adherence to the mucus membrane.

3. The nervous factor in the individual, especially in relation to exalted sensibility of the bowels.

After closely watching the nature, locality, and periodicity of the pain, one feels convinced that it coincides with the natural attempts at separation of mucus from the mucosa.

Were the pain the product of an excessive peristalsis, immediate evacuation, or constant pain till evacuation took place, would be most likely to occur. As it is, there is the paroxysm of pain and a few hours, it may be a day after, or perhaps not until the bowels are opened by enema, evacuation takes place, associated not so much with pain as tenesmus.

SYMPTOMS.

In the majority of cases, after a period, which may range from weeks to months or it may be years, of obstinate constipation, during which time scybalous masses are frequently passed, coated with flocculent mucus, a fairly faithfully repeated and definite clinical picture appears. There is a condition of persistent constipation, and paroxsymal pain, associated with evacuation of mucus and straining and tormina. Flatulence, to a greater or less degree, is present, and is often a most distressing symptom. Sweating of the palms of the hands, headache, and borborygmi are fairly constant features, while, not unfrequently, the patient becomes almost collapsed by the pain. The pulse and temperature are normal. The face is anæmic and anxious-like in expression. Neuralgic pains, especially about the shoulder and jaws, may be present, while there is marked depression of spirits; and frequently insomnia occurs, partly a result of the intestinal discomfort, and partly of nervous origin.

Examination of the abdomen may reveal slight bulging in the left iliac fossa, with tenderness, sometimes of an exquisite nature, elicited by moderate or deep pressure. A sense of resistance is generally present over the sigmoid flexure.

Rectal examination may reveal sacculation, or be entirely

negative in result. As a rule, however, there is tenderness, and sometimes pain, so that the patient is unwilling to submit to frequent examination.

The evacuation may consist of hard fæcal masses, coated with flocculent mucus, sometimes the mucus is found in the interior of a scybalous mass. At other times, the whole motion may consist of a membranous mass, broken up in small pieces; or, as the result of an enema, portions of various lengths, ranging from 2 inches up to 10 inches, may be evacuated.

The mucus readily dissolves in a five per cent. solution of caustic potash. Leucocytes, numerous bacteria and phosphates are also present in the evacuation, and can be determined by microscopical examination.

The important feature is its periodicity, and its absence from the motions during the intervals.

DIAGNOSIS.

The chief difficulty in regard to diagnosis is the persistent confusion of the disease with mucous colitis.

The condition is associated with digestive disorders, both during the attack and interval between the attacks, such as pressure and tenderness in abdomen, distension after food, loss of appetite, sometimes diarrhœa.

The attack itself is indicated by, first, a paroxysm of abdominal pain of the nature of intestinal colic. The degree of pain varies according to the tenacity of the mucus adherence to the mucous lining of the bowel. If it is firmly adherent, violent spasms may result, and this is frequently the case.

Secondly, there is the periodic evacuation.

Just as the pain is seen to be a variable factor, so also is the nature of the evacuation. Mucus, pure and simple, may be passed (sometimes without much pain) of a loose nature, and not unlike frog's spawn; or it may be more solid, cloudy, and less translucent, and in the form of strands, or bands of varying lengths. Or the evacuation may be largely fæcal, with the masses coated with shreddy mucus, or, more rarely, the scybalous mass contains mucus in its interior, and can only be detected by careful scrutiny.

In this connection one might state that the presence of mucus, in hard fæcal masses, occurs in people enjoying perfect health more frequently than is generally imagined.

Curiosity has led me to examine the fæcal matter of several quite healthy people who habitually pass hard motions, and has revealed, in one or two cases, distinct evidence of the presence of mucus.

With the evacuation, tormina and tenesmus are frequently associated, and materially add to the patient's already great sufferings.

It should be borne in mind that the anæmia, wasting, flatulence, fulness in the sigmoid region, tenderness, pain and tenesmus make a fairly accurate simulation of malignant disease about the sigmoid flexure. Here, absence of tumour, or signs of ileus, or blood changes will materially aid the diagnosis. One of my cases occurred immediately after an attack of influenza. It is well known that there is a type of influenza associated with marked abdominal symptoms. These differ from colica mucosa, in so far as they prevail during the acute seizure, and last while the fever lasts, and are usually of the nature of a troublesome diarrhœa, with frequent copious loose stools, tormina and tenesmus. Mucus in excess, or alone, is not usually present in such purely influenzal cases. In any case, the abdominal symptoms following an attack of influenza are of the nature of a diarrhœa. Nevertheless an attack of influenza may, by debilitating a patient, act as a predisposing cause.

One cannot help being struck with the strong likeness which this disease bears, in many ways, to membranous dysmenorrhœa.

Though that condition is not confined to nervous women, yet its most severe manifestations mostly occur in them, and, as there is no evidence that this form of dysmenorrhœa is due to an endometritis, one might argue, with some reason, against confusing, or identifying, colica mucosa with mucous colitis.

The two conditions have some features in common. The periodical paroxysmal pain, the evacuation, the neuropathic diathesis are found in both. There is probably sympathetic relationship between the uterus, with its adnexa, and the colon. On one occasion, after an exhaustive examination of

the rectum, a patient of mine passed a sanguineous fluid from the vagina, when such had not appeared for six years previously, nor did it appear again.

Perhaps, also, the pain in membranous dysmenorrhœa is less associated with expulsion through the os uteri than with the process of separation, the irritation being caused by altered change in the composition of the membrane.

Treatment.—That which is presently adopted aims at the removal of the underlying constipation by dietetic and medicinal means, and drugs which tend to restore the tone of the muscular coat of the bowel.

Lavage of the bowel and rectal injection of olive oil periodically are beneficial. My own experience favours daily injections of half an ounce of sulphate of magnesia, with two drachms of glycerine in a pint of tepid water, given preferably in the morning, and during the acute state of the disease. After some time, a pill containing iron, nux vomica, and belladonna is gradually substituted for the injection.

Massage of the bowel, through the abdominal wall, is of distinct benefit, and the use of a ball, weighing about 4 lbs., can be taught the patient, so that he can daily practise massage in this way.

The dietetic treatment is the line mostly followed on the continent, von Noorden relies chiefly on it, the feature of which is the administration of food, which leaves a large residue in the bowel. One of my patients, when introduced to vegetables, had her symptoms much aggravated, distension of gas, eructation of wind and fluid, and increased pain; while another, who had come under my care here, and who had recently been under Von Noorden, did excellently on a diet containing much cellulose.

It would appear, therefore, that completely uniform dietary, containing indigestible residual material in a large proportion, will not apply in every case, but that each one must be taken and treated separately, after consideration of all the elements of the case and tentative trial of various dietetic measures.

DYSPEPSIA DUE TO GALL-STONES.

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AMONG the minor symptoms of cholelithiasis, dyspepsia holds an important place, and is so described by all writers on the subject. In a patient seen recently, "indigestion" was the first sign of the disease, and, for comparison, an analysis of all the indexed cases (40) admitted to King's College Hospital within the last few years has been made. For the purpose of diagnosis, we may make a clinical division of gall-stone cases according to the first definite symptoms presented. Thus, 26 of these 40 cases were characterised by repeated attacks of biliary colic, often followed by signs of obstruction. Jaundice followed the first attack in half these cases; in the remainder, months and years (up to 13) went by with recurrences of colic before jaundice supervened; in two, it never appeared. In 7 other cases, without these regular symptoms, signs of obstruction of the bile-passages, or of suppurative cholecystitis developed. As a matter of fact, many patients, with a previous history of typical colic, had such complications. Cases complicated by cancer are not included in this series, since the initial lesion was doubtful. No cases of intestinal obstruction, or of acute pancreatitis were met with; the question of adhesions will be considered later.

These figures are introduced to show the comparative frequency of a class of cases (7 out of 40) which completes the series. Such patients present for months, or years, irregular symptoms of pain and gastric disturbance, without definite hepatic colic or jaundice. It is highly probable that many unrecognised cases belong to this group; for only those patients, in whom an ultimate attack of colic and jaundice at length determined the diagnosis (generally confirmed by operation), are included. An excellent example was lately in King's College Hospital, under the care of Dr. Dalton, by whose kind permission I append these brief notes:—

"Thomas W. K., aged 70, was in good health till May,

1905, when he began to suffer from indigestion. This took the form of epigastric pain and nausea three or four hours after food, but only recurred two or three times a week. The pain was not relieved by rest, but was stopped by vomiting; so that the patient had acquired the practice of inducing emesis by draughts of warm water. The vomit did not suggest dilated stomach, and the conclusion of the attacks was accompanied by feelings of intense cold and shivering. Lately, he had adopted a spare diet, and thereby decreased the frequency of the pain. The patient's appetite was good, his complexion, always sallow, had never been jaundiced, but his health became impaired, and, by December, he had lost 2 stones in weight. He was sent into hospital with a diagnosis of gastric carcinoma. Examination showed nothing abnormal in the viscera; a test meal revealed a slight reduction of HCl. In spite of drugs and regular lavage, the patient continued to suffer from irregular pains, which culminated in an attack of severe colic, followed by jaundice and intermittent fever His temperature previously had been slightly irregular, but not febrile. He was transferred to the surgical side, and, at operation a large stone was found and removed from the gall-bladder; the latter was slightly adherent to the omentum. Unfortunately, the patient died from shock. At autopsy, the liver was of normal size, the gall-bladder thick-walled and contracted, while the cystic duct appeared normal. The common bile-duct and its tributaries were dilated, and filled with brown muco-pus; a gall-stone, half an inch long, lay free in the duct a few inches above its termination. Judging from its size, as compared with the small calibre of the cystic duct, and from the absence of facets, it had probably lain in the common duct for some months. The stomach was normal, and free from adhesions; the spleen was enlarged.

A similar case has just left hospital. The patient used to have fairly severe pains in the right hypochondrium about one hour after meals almost every day, so that she was afraid to eat, although her appetite was good. In this case also emesis was self-induced, for relief could only be obtained by completely emptying the stomach; shivering fits were frequent. Finally, an attack of severe pain and jaundice led to diagnosis and operation. Then the stomach and duodenum were found

free from adhesions, but the gall-bladder was full of stones, two of which lay in the common duct. All were removed. Since operation, her digestion has been perfectly painless. The symptoms were essentially similar in the other five cases. In one the pain was not followed by vomiting, while, in another, vomiting recurred with but little pain. This group does not include three patients whose first symptom was an almost constant pain in the right hypochondrium, with occasional vomiting, due to a distended gall-bladder.

Several explanations have been advanced to account for the frequency of dyspeptic symptoms in cholelithiasis: they may be stated as follows:—

(1) The dyspepsia is due to chronic gastritis, which has preceded and favoured the formation of gall-stones.

(2) Adhesions are formed as the result of a local peritonitis around the gall-bladder, and set up "adhesion dyspepsia."

(3) The symptoms are due to inflammation of the bile-passages, with partial obstruction.

With regard to the first view, it is generally agreed that gastro-duodenal catarrh, like constipation, is a very important cause of cholelithiasis. Of the present series of 40 cases, 10 gave a history of chronic indigestion, excluding those cases described above. A comparison of the symptoms in these two groups justifies this separation, and will be detailed later. In particular, the loss of appetite, flatulence, and daily discomfort, rather than pain, that characterise gastric insufficiency, contrast with marked pain of irregular recurrence in the special class. It is obvious that such an hypothesis will not account for the relief of dyspepsia after operation, nor for its onset after attacks of hepatic colic. In one case, a transition between these two types was observed; the pain one week became more acute, and shifted more to the right; later the gall-bladder was felt enlarged.

The second view is based on the fact that, in the great majority of cases, adhesions are formed between the gall-bladder and adjacent organs—omentum, pylorus, duodenum and colon, sometimes with the opening of fistulæ. Mayo Robson states that almost every attack of biliary colic, due to gall-stones, is accompanied by adhesive peritonitis, and to this he ascribes the later symptoms of dyspepsia. These

adhesions interfere with peristalsis, and so after meals cause pain, which is relieved by vomiting. In extreme cases, pyloric stenosis, with dilatation of the stomach, may ensue. This happened in one of the cases in the present series. In that instance, as in most of the cases published, a history of biliary colic and jaundice has been obtained, and so the diagnosis became easier. Without a definite history, the cause of such adhesions is doubtful, and cannot always be settled at laparotomy. In this way, we can account for certain cases of dyspepsia in the subjects of gall-stones. The symptoms of dyspepsia, due to peri-gastric adhesions, may be thus summarised (Hale White, Robson and Moynihan):—Pain and discomfort after food, especially a heavy meal. This pain is relieved by change of posture, such as lying down, and is usually eased by pressure, or the support of a belt, while it is aggravated by exertion. On examination, a lump is commonly felt in the neighbourhood of the pylorus. Unless dilatation of the stomach follows, the cases run a chronic course, and the patients enjoy fair health.

Will the presence of adhesions explain the symptoms and anatomical findings of the special group of seven cases already described? For the sake of comparison, the leading points in the clinical history of such cases may be repeated:—

Pain recurs an hour or so after a meal, but by no means after all food. Days may elapse without pain, and the appetite remains.

The pain is subacute and generally localised in the epigastrium or right hypochondrium, and there is often local tenderness. The pain is not allayed by the recumbent position, nor by gastric sedatives; but is relieved by vomiting and hot applications.

Signs of mild sepsis are present—chills, possibly slight fever, and the general health becomes impaired.

Examination may be negative, but, when the pain tends to be continuous, an enlarged painful liver, or gall-bladder, may be felt. In some cases the spleen is enlarged. Careful scrutiny of the patient by daylight and examination of the urine may show slight signs of jaundice.

The cases run a progressive course, and culminate in attacks of biliary colic and jaundice, not in dilatation of the stomach.

These symptoms resemble those of biliary colic, but are of a mild nature, and of frequent recurrence. The pain seems due less to movement of any stone in the ducts than to inflammation and spasm. The actual presence of a stone in the ducts is not necessary; for Mayo Robson tells of cases of cholecystitis without gall-stones, marked by attacks of severe biliary colic, due to the painful expulsion of mucus. Hence the pain is most liable to recur an hour or so after meals, when the expulsion of bile is normally affected by muscular contraction. Vomiting and hot applications, by relaxing spasm, give relief; the former stops that flow of gastric chyme into the duodenum, which initiates the outpourings of bile (Pawlow). The occurrence of malaise and chills is greatly in favour of an inflammatory origin; for it is well known that ague-like paroxysms of fever recur in catarrhal cholangitis with a stone in the common duct (Charcot, Naunyn, Osler).

With such an association of signs, it is possible to make a diagnosis with some certainty. In doubtful cases, the analysis of a test-meal will give useful assistance.

In conclusion, the chief points in differential diagnosis are added, in order to separate other causes of intermittent epigastric pain and vomiting from this biliary form.

(*a*) Gastric carcinoma may be accompanied by septic phenomena and a sallow tinge of the skin. The appetite, however, is lost early, hæmatemesis may occur, while wasting and anæmia are more striking. A thorough examination is of the utmost importance, and the results of a test-meal usually distinctive.

(*b*) Gastric ulcer, especially in older patients, may not be easy to distinguish in the absence of hæmatemesis. The pain is more constant, and is generally immediately intensified by food. In other cases, food may relieve the pain. It is generally felt on the left side, especially under the scapula, and, on examination, the stomach is tender. A test meal usually shows an excess of HCl., while the symptoms are amenable to rest and diet.

(*c*) Chronic gastritis similarly causes pain on the left side. Its onset is insidious, there is loss of appetite, and usually more complaint of fulness and flatulence than of actual pain.

The symptoms are constantly present, but are better alleviated by rest, diet, and drugs; the gastric secretion is diminished. In many cases of cholelithiasis, such symptoms have preceded the more definite signs of gall-stones, while, in others, the signs of gastric distress and atony follow the formation of adhesions as described.

(*d*) Hyperchlorhydria often recurs at irregular intervals, and, about two hours after food, causes pain, sometimes acute, which is relieved by vomiting. The pain, however, is often eased by pressure, and is removed (at least temporarily) by albuminous food and alkalies.

(*e*) Duodenal ulcer more closely simulates gall-stone dyspepsia, for the pain and tenderness are generally present to the right of the middle line, and tend to recur an hour or so after meals. A history of melæna and hæmatemesis is generally obtained, while a test meal invariably shows the presence of hyperchlorhydria (Robson and Moynihan). Signs of septic absorption are lacking, but exceptionally jaundice has occurred.

(*f*) Gumma is, of course, suggested by the existence of a lump, which cannot be identified with the gall-bladder. The pain is generally due to peritonitis, and is more constant, but may have the characters of "adhesion dypepsia." Examination of the throat and legs may confirm the suspicion, which can be tested by the results of specific treatment.

(*g*) Gastric crises are more severe in character, and rather simulate biliary colic. Their duration is often a great deal longer, and, during the attack, lightning pains may occur in the legs. Vomiting brings no relief, or, at most, a few minutes' respite. In all paroxysmal attacks of "gastralgia," the possibility of tabes should be borne in mind, and the patient examined for loss of reflexes, and the Argyll-Robertson pupil. Abdominal examination shows no painful enlargement of the liver or gall-bladder, and no sign of peritonitis. The pain involves the left side, or passes round the body as "a girdle pain," thus differing from that of hepatic colic. Since the ordinary signs of tabes are not always developed—such as lost knee jerks, etc.—lumbar puncture may be performed as a final resource, and lymphocytosis looked for. The results of radioscopy are too uncertain to be relied upon.

REVIEW OF TROPICAL DISEASES.

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TRYPANOSOMIASIS AND SLEEPING SICKNESS.

SINCE the last Review was written, we have to lament the loss of two workers in Tropical pathology: Schaudinn, whose brilliant work in protozoology is known to all; and Forbes Tulloch, who died as the result of accidental infection, while studying sleeping sickness in Uganda.

Dutton and Todd [1] have found that enlarged lymphatic glands, particularly in the neck, are a very constant feature in trypanosomiasis. By withdrawing some of the juice from such an enlarged gland by means of a hypodermic syringe, and examining it, a simpler and less laborious method of demonstrating the trypanosome is provided than by the examination of the blood, or cerebro-spinal fluid (Greig and Grey). So constant is the enlargement of the cervical glands in sleeping sickness that Todd [2] considers that every native, in and near the infected districts, who shows these enlarged glands without obvious cause, must be considered to be a case of sleeping sickness until the contrary is proved.

So serious has been the spread of sleeping sickness during recent years, that Todd considers that preventive measures are urgently called for. These might consist in (1) the establishment of medical posts of inspection along the trade routes leading from infected to uninfected districts, and (2) the removal of infected persons from posts in uninfected districts to places already infected, but, if success is to be obtained, the methods must be thorough. Mott [3] has investigated the pathological histology of sleeping sickness. He considers that the disease is characterised by a chronic polyadenitis, followed by chronic inflammatory changes in the lymphatics

[1] Liverpool School of Tropical Medicine, *Mem.* XVIII., 1906.
[2] *Lancet*, 1906, II., p. 6.
[3] See *Lancet*, 1906, I., p. 1360.

of the brain and spinal cord. This chronic inflammatory change is manifested by a proliferation and overgrowth of the neuroglia cells, especially those related to the perivascular lymph spaces, also by a proliferation and accumulation of lymphocytes in the dense neuroglial meshwork. Plasma and various other cells can also be seen. Trypanosomes are always found, at some time or another, in the cerebro-spinal fluid, but are very difficult to find in the lesions in the glands and in the cerebro-spinal system. Probably the entrance of the trypanosomes into the cerebro-spinal fluid marks the onset of, and slowly causes, the chronic inflammatory changes referred to. An alternative hypothesis is that the trypanosomes, by multiplying in the lymphatic glands, produce a toxin which is absorbed, and which produces the changes in the cerebro-spinal system. In 80 per cent. of the 30 cases examined, a secondary or terminal microbial infection (generally by a diplococcus or diplostreptococcus) was found.

So far no remedy of distinct service has been found for destroying the trypanosomes in trypanosomiasis and sleeping sickness. Trypan red, promising when tried on animals, has been found to produce nephritis. A meta-arsenic anilin compound, known as "atoxyl," has been used with encouraging results by Thomas and Breinl. This remedy must not be given by the mouth, as it is decomposed by the acid gastric juice. Todd[1] recommends the following mode of administration: a 20 per cent. solution in physiological salt solution is prepared, this is warmed almost to blood-heat before use, and is injected subcutaneously. For from four to six days, 0·6 c.cm. is injected, for a further similar period, 0·8 c.cm., then 1 c.cm. per diem until signs of intoxication commence to appear, after which the injections of a reduced dose, just within the patient's limit of tolerance, are continued for a long period.

Kleine and Möllers[2] report that, by infecting an ass with the *T. brucei* from rat injections, the ass's serum acquires a distinct preventive action against infection both with the *T. brucei* and with the *T. Gambiense* of human trypanosomiasis, as tested on mice.

[1] *Brit. Med. Journ.*, 1906, I, p. 1037.
[2] *Zeitschr. f. Hygiene*, XXV., Pt. II., 1906, p. 229.

Ross[1] has tried the effect of X-rays on various trypanosome infections, but without beneficial result.

Lorand[2] suggests that the lethargy and sleepiness of sleeping sickness may be connected with thyroid degeneration in the disease.

The King of the Belgians, as Sovereign of the Congo Free State, is offering a prize of 200,000 francs, open to all nationalities, for the discovery of a method of successfully treating the disease, and will make a grant of 300,000 francs for the purpose of studying the disease, with a view to its treatment and prophylaxis.

HÆMOGREGARINES IN MAMMALS.

Hæmogregarines were formerly not known to occur in mammals; in fact, they had been met with only in cold-blooded vertebræ; but recently three or four species have been discovered, having as their habitat the blood of rodents. So far none have been found in the blood of man, but these discoveries should certainly warn observers to be on the look-out for this class of parasite.

Bentley seems to have been the first to discover a mammalian hæmogregarine in the leucocytes of dogs in Assam. It occurred as a bean-shaped body lying in the polymorphonuclear leucocytes, and was further described by James. Christophers also described a hæmogregarine, occurring as a vermicular body in the blood-plasma of *Gerbillus indicus*, and Andrew Balfour one in the blood of the jerboa, Lastly, Captain Patton, I.M.S., has discovered a fourth species in the palm squirrel. He describes[3] it as a clear elongated worm-like body, measuring 10 μ. in length, lying in the substance of the large mononuclear leucocytes. In stained films, the parasite is oval in shape, with one extremity larger and rounder than the other, and containing a large quadrilateral-shaped nucleus. The parasite was also found in the body of the louse infesting the squirrels, a new species of *Hæmatopinus*, suggesting that it is conveyed from animal to animal by this intermediate host, though no developmental forms were detected.

[1] *Brit. Med. Journ.*, 1906, I., p. 798.
[2] Ref. in *Lancet*, 1906, I., p. 1775.
[3] *Sc. Mem. Gov. of India*, No. 24, 1906.

SPIROCHÆTÆ.

Breinl[1] publishes some experiments which seem to show that active immunisation of animals with the *Spirochæta obermeieri* (a New York strain) did not protect against inoculation with the spirochæte of African tick fever. This points to the spirochæte of African tick fever being a species different from the *S. obermeieri.*

MEDITERRANEAN FEVER.

A considerable amount of research has of late been devoted to the subject of Mediterranean fever.

The Commission has continued its labours, and a further report[2] has been published, which contains a number of important papers; of which the following are perhaps the principal.

Staff-Surgeon Shaw, R.N., directs attention to the occurrence of cases of an ambulatory type. Twenty-two cases were investigated, all of whom gave a marked agglutination reaction with the *Micrococcus melitensis.* About half of these showed a slight rise of temperature, the others had a normal temperature. From three, the micrococcus was recovered from both the blood and urine, from one from the blood only, and from six from the urine only: thus, in 10 cases, the presence of the *M. melitensis* was definitely proved, and such cases, particularly those excreting the organism in the urine, must be possible sources of infection.

Staff-Surgeon Gilmour, R.N., details experiments on the isolation of the micrococcus from the peripheral blood and its duration of life in soil and water. Out of 36 cases fully examined, the microbe was isolated from the blood in 30, the highest number found was 400 organisms per c.c., but the number was usually less than 100 per c.c., a comparatively small number. The micrococcus, although it does not multiply, can exist for long periods outside the body, in dry sterile garden soil for at least 60 days, in sterile tap water for at least 42 days, in sterile sea-water for at least 13 days, and in non-sterile tap-water for at least 7 days. (Major Horrocks, R.A.M.C., finds that it survives for 20 days in unsterilised soil, and for 28 days in natural dust.)

[1] *Lancet*, 1906, I., p. 1690.

[2] Part IV., February, 1906.

Captain Crawford Kennedy, R.A.M.C., contributes a number of bacteriological examinations of cases of Mediterranean fever. In 32 samples of saliva, the micrococcus was never found, the spleen and liver invariably contain the organism in large quantities during the febrile stage; the lymphatic glands also are great receptacles for the micrococcus. It is also found in the bile, and must therefore make its way into the dejecta, although it was never actually isolated from these.

Fleet-Surgeon Bassett-Smith, R.N., contributes an important paper on the accuracy of the agglutination test for Mediterranean fever. Samples of blood, 150 in number, taken systematically from the wards at Haslar, were examined. The tubes containing the blood were centrifugalised, and the clear serum alone used. The emulsion was made from an agar culture, 10 days old, of a strain of the *M. melitensis* obtained in November 1905. The serum dilution was 1 in 30 accurately made with physiological salt solution. The examinations were both microscopical, with a 4-hour limit, and macroscopical, by sedimentation tubes with a 24-hour limit, and controls were made with a serum that reacted perfectly in dilutions of from 1—30 to 1—1,000. The results show that the reaction is *perfectly trustworthy*, acute cases rapidly agglutinate in fairly high dilutions; with chronic cachectic ones, however, the reaction may be slow, incomplete, and obtainable only in low dilution. The conclusion is formed that, with proper technique when using a 1 in 30 dilution, a positive reaction may be considered conclusive of Mediterranean fever, past or present. On the other hand, it would not necessarily be correct to state that a patient is not suffering from the disease. The chief sources of fallacy are probably (1) faulty technique; incorrect dilutions, too long time limit, etc.; (2) faulty cultures; containing false clumps before use, etc.; (3) faulty observation; mistaking false clumps for true agglutination; (4) faulty history; the patient having previously had the disease.

Bassett-Smith considers that the sedimentation test is least likely to give rise to error, provided that *clear* serum is used, and the microbial suspension is sufficiently strong to give a visible pellet at the bottom of the tube. Dead cultures were found perfectly satisfactory for carrying out the test.

The modes of infection and transference of Mediterranean

fever from one person to another are the subjects of several papers. Major Horrocks, R.A.M.C., experimented on monkeys, and came to the conclusion that neither skin contact, nor the parasites of the animals convey the disease.

The fact that the goats have often been found to be infected has naturally led to much work in this direction. Major Horrocks and Captain Kennedy find that probably 41 per cent. of the Maltese goats are infected (Zammit, by making use of an agglutination reaction with the *milk*, finds the number to vary in different districts from 0 to 25 per cent.), that 10 per cent. excrete the *M. melitensis* in their milk, that monkeys and goats can be infected by being fed with the infected milk, that goats can be infected with dust polluted with the urine of cases of Mediterranean fever, and that Pasteurisation of the milk destroys the micrococcus. Kennedy has also observed that dogs and mules may also be infected.

The rôle of mosquitoes and other insects in conveying the disease has naturally been investigated. *Culex pipiens* and *Stegomyia fasciata* may act as carriers of the micrococcus, and may play a part in the causation of the disease, especially as a monkey was apparently infected by mosquito bites. The *Acartomyia zammitii*, which breeds in salt-water pools, apparently plays no part in the propagation of the disease, nor does the *Stomoxys calcitrans*.

Captain Lamb, I.M.S., and Surgeon Pai[1] give definite proof of the existence of Mediterranean fever in India. In 200 control experiments, carried out on healthy individuals and enteric fever patients, the agglutination reaction was never obtained. In eleven cases, the subjects of continued fever, not enteric, and not yielding to quinine, the *Micrococcus melitensis* was obtained from the spleen during life by puncture and cultivation. The proof that the organism obtained was the *M. melitensis* was (1) morphological, cultural, and staining reactions were those of the micrococcus; (2) monkeys inoculated gave typical temperature charts and an agglutination reaction; (3) the micrococcus was agglutinated with known Malta fever serum. In several other cases, the agglutination reaction was obtained. Forster[2] also records

[1] *Sc. Mem. Gov. of India*, No. 22.
[2] *Lancet*, 1906, I., p. 441.

the isolation of the *M. melitensis* from the milk of the domestic goat in the Punjab.

Cardaliagnet[1] records the occurrence of Mediterranean fever in Tunis, where also some of the goats give the agglutination reaction. Mediterranean fever also seems to be endemic in South Africa. Bruce saw a case in Kimberley in 1901. Strachan, of Orange River Colony, recorded, in 1905, 72 cases of prolonged pyrexia, of which 25 gave the agglutination reaction. Birt[2] examined the blood of 19 cases of Dr. Strachan's, and obtained undoubted reactions. It would seem, therefore, that Mediterranean fever is endemic in Orange River Colony, and it is interesting to note that goats' milk is largely used in the districts in which the disease has been met with.

PLAGUE.

It is announced that the Plague Commission, now investigating the disease in India, has obtained definite experimental proof of the transmission of plague by means of the rat fleas.

Klein[3] has published a preliminary report on a new plague prophylactic. The following is an extract from this report, and gives the essential details:—

"(1) Investigating the vitality of *B. pestis* in certain organs of animals dead of plague, organs which had been subjected to drying on various materials (wood, cloth, linen) at various temperatures over sulphuric acid, I found that after all *Bacilli pestis*, originally contained in such plague organs, had been killed in the process of drying, emulsion, made of these dried organs and injected in definite amount into mice and rats, was capable of causing death of these rodents within 20 hours or less—the animals exhibiting phenomena not differing from those observed in acute plague, except, of course, that their tissues did not after death contain any *B. pestis*. Also I found, when employing for injection an amount of emulsion insufficient to cause speedy death, that the animals, though made ill—exhibiting, for instance,

[1] Ref. in *Bull. de Pasteur*, IV., 1906, p. 527.
[2] *Journ. Roy. Army Medical Corps*, January, 1906.
[3] Report to the Local Government Board, No. 223.

local tumour and more or less constitutional disturbance—commonly recovered; and further that these recovered animals, when tested later on by injection with virulent *B. pestis*, were refractory to plague infection.

"I have shown in my Reports to the Local Government Board for 1901–1902 and 1902–1903, that guinea-pigs inoculated *cutaneously* with plague material (by an abrasion or a scratch of the cutis) develop, as a general rule (unless, indeed, the infective material be of extreme virulence), plague in what I have termed the 'sub-acute' form; a form marked by necrotic bubo, necrotic nodules in the spleen and liver, and particularly by necrotic nodules and necrotic patches in the lungs.

"Examining sections of the organs containing the necrotic nodules and necrotic patches of guinea-pigs dead of sub-acute plague, it is seen that, while the central parts of the necrotic nodules are crowded with *B. pestis*, the peripheral portions (except their vessels), although quite broken down into dead débris, contain few, if any, bacilli. From this it may be inferred that, as is the case in other bacterial diseases associated with necrotic changes of the tissues, such necrosis is not caused by the mere presence of the bacilli themselves, but by the toxin produced by them. As an illustration may be mentioned the necrotic action of the diphtheria toxin on a mucous membrane.

"In view of the two considerations above, I determined to inject into a series of animals the dried organs (containing organ-toxin and dead bacilli) of various rodents dead of plague, with the purpose of ascertaining the ability of these materials to protect similar rodents against subsequent infection with virulent *B. pestis*.

"A considerable number of experiments and observations were in the first instance made by me in order to ascertain the best mode of preparing and preserving prophylactic material of this nature, as well as to determine which portions of the body of an animal, dead of plague, are the most efficacious for the purpose. It is not necessary to describe in detail here all the steps adopted; they will be fully dealt with in a forthcoming Report of the Medical Officer of the Local Government

Board. Suffice it to say that they comprised experiments with :—

"(*a*) Dried material of all the organs of mice, of guinea-pigs, and of rats dead of acute virulent plague ;

"(*b*) Dried material of the bubo and spleen alone of mice, guinea-pigs, and rats dead of acute plague ;

"(*c*) Dried material of all the organs of guinea-pigs dead of sub-acute plague, *i.e.*, of guinea-pigs in which death occurred after four or five days with necrosis of the bubo, necrotic nodules of the spleen, liver, and lungs ; and

"(*d*) Dried material of those organs alone which showed necrotic changes ; that is bubo, spleen, lungs, and liver of guinea-pigs dead of sub-acute plague.

"These several materials were dried :—

"(*e*) At the temperature of the laboratory over sulphuric acid.

"(*f*) At the temperature of 20° C. over sulphuric acid.

"(*g*) " " 37° C. " "

"(*h*) " " 46-47° C. " "

"The result of these experiments showed that a variety of tissues—the bubo, the enlarged spleen, and the affected lung containing abundance of necrotic masses, as also the liver when it contains abundance of necrotic nodules—of guinea-pigs dead of sub-acute plague (*i.e.*, dead after 5 and 9 days), cut out and finely minced aseptically, spread out in thin layers in sterile glass plate dishes and dried over sulphuric acid at 46–47° C., yield a material which not only can be very easily and rapidly prepared but which is of a uniform and reliable efficacy, and in every way, indeed, superior to any of the other prophylactics.

"The guinea-pig, as compared with the rat, being a 'clean' animal, appears greatly preferable for the above purpose. There is no difficulty in preparing and preserving the above necrotic organs, which yield comparatively the greatest amount of material, in a clean manner, and the exposure to 46° C. prevents growth and multiplication in them of any stray or accidental bacteria. A guinea-pig of about 300–400 grammes weight will yield 5–7 grammes of dry powder prepared from the bubo, spleen, lungs, and liver ; and, as the reliably protective dose for an adult rat (*see* below) is 10-15 milligrams, it follows, therefore, that one large guinea-pig can yield about

400–600 doses. Three days' drying in thin layers over sulphuric acid at 40° C. was found more than sufficient to devitalise all *B. pestis* contained in these organs. After 3 days' drying the dry scales of material are rubbed down to a fine powder in a sterile mortar; this powder is then transferred to a sterile wide-mouthed bottle, plugged with sterile cotton wool, which is placed for 2 to 3 days at 37° C. in order to thoroughly complete the process of drying. At the end of these 3 additional days the cotton-wool plug is replaced by a glass stopper and the prophylactic is ready for use. It can thus be preserved indefinitely in a dry state by a layer of paraffin over the stopper. Such material tested by cultivation is found sterile; it yields no growth of any kind.

"In preparing the prophylactic for use the desired amount of powder is weighed out, well rubbed down in a desired amount of sterile warm distilled water, and the turbid emulsion thus obtained is injected subcutaneously. The principal consideration is, of course, the amount of dry powder; the amount of water used per dose is immaterial. I generally use ½ c.c. of water per dose but there is no reason why ¼ c.c. or 1 c.c. should not be used."

The serum treatment of plague is dealt with in a report by Bannerman.[1] Four different sera were used, those of Roux and Yersin, Lustig, Brazil, and Terni. Bannerman concludes that the Roux-Yersin serum did not affect the case mortality in the slightest degree, with the Lustig serum the case mortality of the serum-treated patients was higher than among those receiving ordinary treatment, with Terni's serum there seemed to be a reduction in case mortality of 0·91 per cent., and with Brazil's serum of 2·85 per cent.; but it seems questionable if this saving of life can really be credited to the serum. The serum, however, does ameliorate the symptoms, and serum-treated cases live longer than control cases without serum. It seems a pity that the serum was not administered more frequently by the intravenous method, as is so strongly recommended by Calmette.

VERRUGA PERUANA AND CARRION'S DISEASE.

Some three or four years ago, Barton isolated from cases of Carrion's disease a peculiar bacillus, which has lately been

[1] *Sc. Mem. Gov. of India*, No. 20.

determined to belong to the paratyphoid group by Tamayo, whose conclusions are as follows[1]:—

(1) Barton's paratyphoid bacillus is found only in cases of pernicious fever of Carrion's disease.

(2) Inoculations do not give rise to verrugæ, but to a typhoid septicæmic state.

(3) Carrion's pernicious fever is a typhoid or paratyphoid disease, attacking the patients suffering from verruga.

(4) Barton's bacillus is not the pathogenic agent of verruga peruana.

(5) Barton's bacillus gives rise to a secondary infection occurring during an attack of verruga, which attack predisposes to the infection. This secondary affection has all the clinical characteristics of enteric fever.

BERI-BERI.

Hamilton-Wright[2] describes the pathological condition in a case of beri-beri, which died at the Seamen's Hospital, Royal Albert Dock. The mucosa of the stomach and duodenum was much congested. Microscopically, the mucosa of the stomach and duodenum exhibited more or less marked necrosis with sloughing of areas of villi. In these sloughs, a large anaërobic Gram-staining bacillus was present, but no organism could be cultivated from the blood. These lesions and the organism present are similar to those described by the author in cases of beri-beri in the East.

Herzog[3] records some studies on beri-beri made at the Japanese Military Hospital, Hiroshima, during the late war. Attention was specially directed to a search for a coccus, isolated by Kokubo from the urine in cases of beri-beri, and believed by him, and by Okata to be the cause of the disease. Kokubo's method of isolation is as follows:—Ordinary, slightly-akaline agar medium was first melted in tubes and then poured into petri dishes. After the agar in the plates was thoroughly hardened and dried, it was inoculated from the urine which had previously been collected in sterile receptacles, by making streaks over the surface of the media with a platinum loop.

[1] Ref. in the *Journ. of Tropical Medicine*, May 15, 1906, p. 159.
[2] *Brit. Med. Journ.*, 1906, I., p. 1095.
[3] *Philippine Journ. of Science*, I., No. 2, 1906, p. 169.

The petri dishes were then placed in the incubator in an inverted position, and examined, at first, after twenty-four hours, and then successively from day to day. Herzog examined the urine from about thirty to forty cases of beri-beri, and in eight was successful in obtaining a coccus, which apparently was identical with the one described by Kokubo.

The coccus stains by Gram, grows freely on culture-media at blood-heat, does not liquefy gelatine, and gives a stringy sediment in broth, the broth remaining clear. Inoculated into monkeys, it does not produce any disease at all resembling beri-beri.

Daniels[1] has published a valuable report on his observations on beri-beri in Malaya of which the following are the principal conclusions :—

1. That beri-beri is an infectious disease. As a rule, a short period of incubation and a period of exposure of less than three months are requisite for full development of the disease where the "endemic index" is high.

2. That there is no definite proof that an intermediate host is required, but the balance of evidence is against its being conveyed by earth, air, water, or food, or contamination with sewage or other fæcal matter.

3. That there is some evidence that, for a short period only after the occupation of small spaces, beds, bedrooms, etc., the "poison" or carrier of infection may remain.

4. That food, either as regards quantity and quality, its nature or relative proportions, may have an effect on the susceptibility of the patients, though the proofs are not conclusive, but is not the causative agent.

5. That if an intermediate host for the unknown parasite is required, it must be either a cimex or a pediculus. That pediculi, as carriers, would better explain the incidence of the disease than any other blood-sucker.

6. That a closer enquiry into the earlier stages of the disease is required. That where opportunities for such an inquiry occur, renewed attention should be bestowed on the blood and tissues, with a view to determining the presence or absence of any protozoon.

[1] "Observations on Beri-Beri." *Studies from Institute for Medical Research*, Federated Malay States, Vol. IV., Pt. 1, 1906.

7. Prophylaxis. That in view of the failures of various attempts at disinfection of buildings and places, and of various modifications of diet to have marked effects, more attention should be paid to limiting the chances of personal infection, and that particular attention should be paid to the personal cleanliness, freedom from vermin, and isolation of early, or trivial cases of the disease.

Miller and Turner[1] record a number of clinical observations on beri-beri in South Africa. As regards drugs, they state that they have constantly seen marked benefit result from the use of urotropine in doses of 5 grains, well diluted, three times a day, combined in urgent cardiac cases with tincture of digitalis in 10 minim doses.

YELLOW FEVER.

An interesting and instructive report on yellow fever in British Honduras has been published by Boyce,[2] and is illustrated with a number of charts, diagrams, and photographs. Boyce considers that it is often very difficult to distinguish between yellow fever and certain types of malaria, in which there may be present a very slow pulse, jaundice, vomiting, bleeding from the gums, delirium, retention of urine, traces of albumin and constipation; post-mortem examination is often the only means of clearing up the diagnosis. The *Stegomyia fasciata* is present throughout the year in the colony. With regard to the proposed Panama Canal, Boyce considers that "it will be only by the most vigilant anti-yellow fever sanitation that yellow fever will be extinguished, and that any possible risk of infecting Asia, on which Sir Patrick Manson lays such stress, will be prevented." The New Jersey State Legislature has recently passed an Act for the extermination of mosquitoes. The title of the Act is as follows:—An Act to provide for locating and abolishing mosquito-breeding salt-marsh areas within the State, for assistance in dealing with certain inland breeding places, and appropriating money to carry its provisions into effect." The full text is given in *Science* (June 1, 1906).

[1] *Transvaal Med. Journ.*, I., 1906, p. 260.

[2] *Report to the Gov. of British Honduras upon the Outbreak of Yellow Fever in that Colony in* 1905, by Rupert Boyce, M.B., F.R.S. (J. and A. Churchill, 1906.)

A *Times* correspondent gives, in the issue of November 20, a graphic description of the means taken to stamp out yellow fever in Panama. The first cases of the disease were concealed, and it was not until a serious epidemic was in progress that President Roosevelt, on his own initiative, Congress having refused to aid him, appointed Judge Magoon to Panama as resident governor of the canal zone with autocratic power. The presence of fever was bad enough, but the demoralisation of public spirit in the American colony was worse. Governor Magoon found that while some in utter panic were fleeing from the isthmus as a plague spot, others had fallen into a state of cynical bravado. They professed contempt for the mosquito theory of disease dissemination, and refused to obey the preventive rules which had been formulated. They took a boastful delight in exposing themselves to mosquito bites, and tore holes in the netting which had been placed over the windows of the office buildings and hotels. The Governor soon changed all this, expressed his own fear of the disease, insisted that the evidence of the transference of the disease by mosquitoes was overwhelming, and arranged for the fumigation of every building in the city. Medical inspectors were also appointed, who daily examined every inhabitant. The effect of these measures is shown by the figures of the incidence of the disease:—in May there were 38 cases; in June, 62 cases; in July, after the institution of these measures, 42 cases; in August, 27 cases; in September, 6 cases, and since then not a single case, although a reward of 50 dollars (gold) was offered for a notification.

Rosenau and Goldberger[1] give some results of their work on yellow fever done at New Orleans during the latter part of the epidemic of 1905. Attempts were made to cultivate a parasite by means of Novy's blood-agar medium. The results were entirely negative. The hereditary transmission of the yellow fever virus from mosquito to mosquito, stated by Marchoux and Simond[2] to occur, was also investigated, but with entirely negative results in the 13 instances tried. It is suggested that further work is needed in this direction.

[1] Yellow Fever Institute, *Bulletin*, No. 15, (Washington, 1906.)
[2] *Comp. Rend. Soc. Biol.*, Paris, LIX., No. 27, p. 259.

A REVIEW OF RECENT WORK IN VENEREAL DISEASES.

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THE SPIROCHAETE PALLIDA.

In a previous review (THE PRACTITIONER, August 1905), allusion was made to the discovery of this organism in certain syphilitic lesions by Schaudinn, and to the confirmation of its existence in such lesions by Metchnikoff and Roux. During the past year, this bacillus has been the object of much research, with the result that the characteristics and peculiarities of the organism have been rendered more familiar, and the technique of the microscopical examination has been greatly simplified. Our present knowledge on the subject may thus be briefly summarised; the spirochaete pallida is a minute protozoon, the average length of which is from 5 to 10 microns, and breadth $\frac{1}{2}$ micron; in shape it is curved somewhat like a corkscrew, the curves varying in number from 4 to 20, while it is sharpened off at its extremities. Its minute size renders it necessary to use the highest power lens available, $\frac{1}{12}$ or $\frac{1}{16}$ inch oil immersion, for its detection. The organism is motile, and is capable of rotating on its long axis with snake-like movements, and it is occasionally flagellated. It belongs to a group of microbes which could not be cultivated on any of the artificial culture media hitherto employed. It must be distinguished from another spirochaete, which is found in ulcers, venereal or otherwise, and also in the smegma preputii; this forms a larger spiral with fewer curves, is saprophytic in nature, and takes the Giemsa stain far more readily than the spirochaete pallida, hence it has been called the spirochaete refringens. The staining of the spirochaete pallida is a matter of considerable difficulty, as it is very refractory to ordinary aniline dyes, and the following are some of the methods in use. The Giemsa method, consisting of a solution of eosin and azur; Dr. Wright's bloodstain, composed of methylene blue, eosin precipitate, and pure methyl alcohol; Oppenheim and

Sach's method, carbolic acid, and an alcoholic solution of gentian violet; De Marino's method, azur blue, methyl alcohol and eosin; Levaditi's plan, by impregnating the tissue with nitrate of silver, and subsequently using the Giemsa stain, and, lastly, a special stain devised by Dr. Goldhorn. In order to obtain the organism from a syphilitic ulcer, the surface should first be thoroughly cleansed with water and sterilised gauze, or scraped with a sharp spoon, and when the hæmorrhage ceases, a deeper scraping will show the spirochaete. In cutaneous lesions, a blister may be raised by applying Liq. Epispasticus, or strong Liq. Ammoniæ, to the syphilide, and on pricking this the spirochaete will be found in the serum. It is also present, in large numbers, in mucous patches of the buccal mucous membrane. From lymphatic glands and internal organs, such as the spleen, it can be obtained by extracting some of the gland juice by means of an aspirator. It has, on rare occasions, been observed in the circulating blood, but most investigators have failed to discover it here, and are sceptical as to its existence in this medium; but, in the scrapings from ulcers, it is said to be found in the neighbourhood of, or attached to, the red corpuscles. It is said to be absent from gummata and tertiary syphilitic lesions, and only to be found during the contagious periods of the disease. In congenital syphilis, it has been found both in the cutaneous lesions and in the internal organs, such as the liver, lungs, and particularly in the supra-renal capsules. The number of spirochaetes found in any syphilitic lesion is in direct proportion to its infective power, consequently the organisms are numerous in mucous tubercles of the genital organs and mouth, the most prolific sources of the syphilitic contagion. Further, in congenital syphilis, the greater the number of spirochaetes present, the more rapidly fatal is the issue of the case. The *Spirochaeta pallida* was found by Metchnikoff and Roux in apes, which had been experimentally inoculated with syphilis, a discovery confirmed in this country by Grunbaum and Smedley, who found it on the thirty-seventh day after inoculation. Kraus, of Vienna, had also succeeded in transmitting it, by inoculating from one monkey to another. These facts lead to the conclusion that the spirochaete pallida plays a highly important part in the ætiology of syphilis,

the points in favour of this theory being thus summarised by Alvarez (*Jour. of Amer. Med. Assoc.*, June 1906). It was constantly present in syphilitic lesions in their various stages, and was never found in non-syphilitic lesions; it was present in the organs of congenital syphilitics, and also in the placenta, and was also found in the secondary lesions of monkeys, being capable of transmission by inoculation from one animal to another. The retention of the syphilitic virus by the unglazed filtre showed that the causative organism was not ultra-microscopic. The spirochaete seemed to be morphologically more distinct as a species than the other spiral organisms, and was more highly differentiated as a parasite, whilst it soon disappeared when removed from living tissues.

In an essay on this subject, Pereira concluded (1) that the infective virus of syphilis, whatever its nature, did not pass through a coarse filter, and consequently was not ultra-microscopic; (2) that, though it had not been discovered in tertiary lesions, yet it was invariably found during the actively contagious periods of the disease; (3) that it was found in the internal organs and in the blood of congenital syphilitic children, and also in monkeys artificially infected with syphilis, but had not been found in any other morbid condition, or in the healthy subject.

Levaditi (*Annales de l'Institut Pasteur*, January 1906) has continued his researches on the presence of the organism in the subjects of congenital syphilis, and has arrived at the following conclusions:—The influence exerted by the spirochaete on the genesis of visceral and cutaneous lesions, as well as on the course of the disease in the newly-born, is evidenced by the fact that the organs in which the protozoon is found in the greatest numbers—the liver, lungs, suprarenal capsules and skin—are those which are macroscopically and microscopically most affected by the syphilitic virus. Organs, such as the brain and kidneys, which are not so frequently attacked in congenital syphilis, are found to be relatively free from the organism, a fact which definitely disproved the hypothesis that the spirochaete was only a secondary infection, which had no bearing upon the pathology of syphilis. The theory of a secondary infection was also rendered improbable by the fact that a large number of the spirilla were found in the internal

organs of a fœtus born dead, and in children, who succumbed after a few inspirations, and who had had nothing introduced into their digestive tract. There was a distinct relationship between the severity of the disease and the number of the organisms found; in the acute forms of the disease, which proved rapidly fatal, they were widely diffused, whilst in the cases, in which the appearance of symptoms was delayed, they were present almost exclusively in the liver. The spirochaete was found in the greatest numbers in the liver, the organ which was the first to receive the blood charged with the syphilitic virus, and which came to it directly from the maternal placenta, and the liver was the viscus which was most frequently attacked in congenital syphilis. Although it was through the blood-stream that the organism was distributed in the tissues, yet the blood was not the medium selected by the spirochaete for its development, but rather the connective tissue and glandular epithelium in organs such as the liver, kidney, suprarenal capsules, and sweat-glands. The influence exercised by the spirochaete on the genesis of syphilitic lesions is a direct one, and is not due to any toxins elaborated by these parasites. The fœtal organism defends itself against this invasion of spirilla by a vigorous phagocytosis, which is specially well marked in the pulmonary alveoli.

Maclennan (*B. M. J.*, May 12th, 1906) had made a comprehensive examination for the spirochaete pallida in over fifty cases, and was struck by its absence, or comparative scarcity, in a large number of his slides. Forty of the series were females, and in only eight of them was the organism found, while in all the cases some smaller bodies were detected, similar to those described by Siegel under the name of cytorrhyctes luis (*Münch. med. Woch.*, 1905, Nos. 28 and 29). The spirochaete is not found in numbers commensurate with the severity of the lesion, and the inference is that it is not always present, and that its staining capacity varies at different periods, whilst its scarcity would lead one to hesitate before accepting it as the ætiological factor of syphilis. In cases of a generalised syphilitic eruption, no spirochaetes had been found, but other smaller bodies were invariably present in large numbers, the presence of which led the author to the conclusion that the spirochaetes were merely stages in the

development of an organism which was probably the cause of syphilis. The smallest representatives of the organism were small spheres of protoplasm, which subsequently developed tails, and every stage between these tailed bodies and the spirochaete could be made out. The less mature bodies were vastly more numerous than the spirochaetes, and it seemed to be a hasty, or premature deduction to label the more conspicuous but scarcer spirochaetes as the specific organisms. The name, *Spirochaeta pallida*, only denoted one stage in the history of an organism, while the cytorrhyctes luis probably denoted another.

Thesing criticises Schaudinn's discovery of the spirochaete pallida hostilely, disputes the propriety of classifying it amongst the protozoa, and considers that there is no proof of its being an ætiological factor in syphilis.

Castellani (*B. M. J.*, November 18th, 1905) states that in 7 out of 11 cases of parangi, or yaws, a spirochaete had been found absolutely identical with the spirochaete pallida of Schaudinn, and the latter had informed him that the organism present in the non-ulcerated lesions was morphologically identical with the spirochaete pallida.

THE PROPHYLAXIS OF SYPHILIS.

Metchnikoff, in his Harben lectures at the Royal Institute of Public Health, discussed "Hygienic Measures against Syphilis." The frequency of the disease was universally admitted, but there were many even among the medical profession who did not sufficiently appreciate its influence upon mortality. Though in itself it was not a fatal disease, yet it was one of the principal agents in shortening human life, and in bringing about mortal disease. As a proof of that fact, he instanced the researches of Runeberg, of Helsingfors, who, from a study of documents of an insurance society, had ascertained that of 734 deaths amongst insured persons during a period of 22 years, over 11 per cent. were due to syphilis and its sequelæ, as against 22 per cent. due to tuberculosis, and 10 per cent. to pneumonia. With a view of checking the ravages of this disease, many attempts had been made to discover a preventive serum; but the experiments at the Pasteur Institute had only yielded a serum of low efficiency. This might have been due

to the fact that insufficient virus had been injected into the animals utilised for the experiments, and better results might have been obtained had larger quantities been employed. Until now, all attempts at cultivation of the spirochaete pallida in any of the known artificial culture media had been unsuccessful, and more research was required before a practical method of cultivating the spirillum on a large scale could be obtained, and, even if that were accomplished, it was doubtful if the prophylaxis of syphilis could be effected by sero-therapeutic measures. Prevention by vaccines of attenuated virus or products of the virus might possibly be successful, but the same difficulties were encountered in the search for a vaccine as in the preparation of an efficient serum. Experiments were related which tended to prove that the Macacus monkey might attenuate the virus for its own species and also for mankind; but even if such a vaccine could be obtained from the Macacus, it could only be employed in man in very exceptional circumstances. It could only be practised on those who were exposed to the greatest risk of contracting syphilis—for instance, those who were just commencing a life of prostitution; and these subjects, being young and ignorant of life and disease, would not be likely to submit themselves to such a procedure. Consequently, other methods of prophylaxis against syphilis must be sought; and that which appeared to hold forth the greatest prospect of success was the local application of mercurial ointment. Experiments on monkeys had shown that, if calomel ointment was rubbed into the seat of a syphilitic inoculation very shortly after the introduction of that virus, the development of syphilis was thereby prevented. Following up these researches, the experiment was tried on the human subject, a medical student voluntarily submitting himself to the test. He was inoculated with the virus of two syphilitic chancres, and one hour subsequently an ointment of calomel, one part of calomel to three of ointment, was thoroughly rubbed into the seat of inoculation. No signs of syphilis followed in the case of the student, or in a Macacus inoculated at the same time and from the same source, and subsequently treated similarly with calomel ointment. The same experiments had also been carried out by Neisser upon monkeys, and usually with the same result. There were some

who thought that all measures for prophylaxis against syphilis were wrong, but, as a large number of sufferers from the disease were innocent, they surely were entitled to some consideration, for, in questions of health, morality should not attempt to lead hygiene, but should rather follow it.

INTRA-MUSCULAR INJECTIONS OF MERCURY IN SYPHILIS.

Lambkin (*Brit. Med. Journ.*, November 11, 1905) considers that the credit for the better treatment of syphilis in the Service was entirely due to intra-muscular injections, and thinks that its non-adoption in civil practice is due to conservatism, to want of knowledge of the technique, and to the dangers alleged against it by its opponents. Until recently, the teaching in England has been to give mercury by the mouth, and only experience would convince the surgeon that in many cases such treatment would be futile. The dangers alleged against intra-muscular injections had been grossly exaggerated, and were due either to ignorance or to neglect of the necessary technique, as was proved by the fact that Lambkin had given 60,000 injections without an accident. The soluble salts used were the perchloride, the sozoiodolate, the benzoate, and the biniodide of mercury, but the objections to their use were the frequency with which they had to be introduced, and their slow and untrustworthy action. Of the insoluble preparations, calomel was by far the most active, and might be reserved for urgent cases in which a rapid effect was required, since its introduction was most painful; salicylate of mercury had been found untrustworthy, and its action was not nearly so well marked, or so rapid, as that of either calomel or metallic mercury. Metallic mercury made up with lanolin in the form of a cream, ten minims of which contained one grain of mercury, was the preparation which yielded the most satisfactory results in the majority of cases, being specially indicated on account of its gradual, even, and slow absorption. The dosage of this cream was ten minims introduced once a week. The injections were made with the usual precautions as to asepsis, into the gluteal region (but no indication was given as to which part of that region to select and which to avoid, a remarkable omission, seeing that nearly all the accidents consequent upon these

injections have occurred through thrusting the needle indiscriminately into the buttock, regardless of the situation of the important vessels and nerves in that vicinity). One injection should be given weekly until all active signs of the disease had subsided, on an average from six weeks to two months, and then one injection was given once a fortnight for three months. Then followed an intermission from treatment for two months, and then a three months' course of fortnightly injections, the average period of treatment and repose being about two years. The old truism was mentioned that "the earlier mercury is given, the more it modifies the after signs and symptoms of syphilis," but no mention was made of the difficulty, or even impossibility, of arriving at a diagnosis in many cases, until the appearance of some secondary manifestations. The usual precautions as to the hygiene of the mouth, as to the necessity for watching the body weight, and as to a periodical examination of the urine were duly insisted upon.

TREATMENT OF SYPHILIS BY RECTAL MEDICATION.

Mr. C. Audry (*Annal. de Derm. et de Syph.*, March 1906) gives an account of 30 cases treated in this manner, with a view of showing that this was a plan which might be adopted with advantage, as it proved thoroughly efficient and was well tolerated by patients. He now habitually used suppositories of grey oil, and had on one occasion tried cyanide of mercury, but abandoned it, as, on the fourth day, the presence of mercury in the urine was doubtful, and the grey oil appeared to be more rapidly absorbed. It was possible, and indeed probable, that one might find a more suitable preparation in the future, but that could only be proved in course of time. The suppositories were prepared with cacao-butter, and contained two, three, or four centigrammes of metallic mercury. In many cases, two suppositories were introduced daily, but this was given up as the patient subsequently experienced considerable smarting pain in the rectum. Ultimately one suppository containing three centigrammes of mercury was given every night for one month, when a rest of four or five days was allowed, and then the treatment was renewed. The treatment was well borne by the patients, and though some complained of diarrhœa, this was probably due to other causes; there was

no pain, no tenesmus or spasm, excepting in the cases in which more than one suppository was given in the 24 hours. One patient showed a return of a gingivitis, from which he had previously suffered, otherwise there was nothing unusual noticed in the condition of the mouth, if the hygiene of the mouth was attended to as when mercury was given by other methods. Though, in the majority of the cases, the treatment had not been continued for any prolonged period, yet one case was mentioned of a child three and half years of age, to whom 100 suppositories of one and a half centigrams of mercury had been given during a period of four months without the least inconvenience. The treatment was considered to be quite as satisfactory as when the drug was administered by the mouth, and was quite as efficient as any oral treatment, excepting possibly large doses of perchloride of mercury. Though no cases of malignant syphilis were treated in this manner, yet many multiple and severe syphilitic manifestations yielded to it in due course. As a rule, the symptoms showed signs of amelioration after the fourth day, as in the more ordinary modes of treatment, and mucous tubercles of the buccal mucous membrane and ano-genital region rapidly cleared up under this method. Severe papular eruptions quickly improved, excepting in the case of alcoholic subjects, who equally resisted treatment by injections of grey oil. In general, if the patients were treated first by these mercurial suppositories, and subsequently submitted to treatment by inunction or intramuscular injections, the action of the latter methods did not produce any more rapid disappearance of symptoms. Two patients with a papular syphilide of equal severity were treated, the one with suppositories, the other with intramuscular injections of grey oil, and the symptoms cleared up equally rapidly in the two cases. The treatment would not compare with inunctions, or intramuscular injections, in severe manifestations of the disease ; but, in mild cases, it was quite as satisfactory as the oral administration of mercury, and was preferable to the latter in cases, in which the gastric, or intestinal, digestion was deranged, whilst in children it appeared to be the most efficient plan of treatment. It was of advantage to have at our disposal a new method of administering mercury, especially since it was efficient, simple, and harmless.

Prize Essay.

THE NATURE AND TREATMENT OF SPASMODIC BRONCHIAL ASTHMA.

By G. S. HAYNES, M.B., B.C., etc.,

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It is only within recent years that the true nature of spasmodic bronchial asthma has been clearly demonstrated. Many theories have been advanced to account for this widespread, distressing condition, but none of their exponents have been able, until recently, to produce sufficiently convincing evidence in support of them.

The most important of these theories may be classified, as by Osler, as follows:—

1. That it is due to a spasm of the bronchial muscles.

2. That it is caused by a swelling of the bronchial mucous membrane.

(*a*) Fluctionary hyperæmia (Traube).

(*b*) Vaso-motor turgescence (Weber).

(*c*) Diffuse hyperæmic swelling (Clark).

3. That in many cases it is a special form of inflammation of the bronchioles, bronchiolitis exudativa (Curschmann).

4. That it is due to a reflex spasm of the inspiratory muscles, especially the diaphragm.

In addition, Haig considers it to be due to "collæmia," an excess of uric acid in the blood, giving rise to capillary obstruction, and a rise in the intra-thoracic blood-pressure; while other writers have suggested an atelectasis pulmonum as a frequent cause.

Before disscussing these theories in any detail, it may be well to refer to the essential characteristics of a typical attack of true spasmodic bronchial asthma. There is sudden urgent dyspnœa, with violent inspiratory efforts, coming on with or without warning, by day or by night, and frequently ceasing abruptly, usually with the expectoration of a few small

pearly-white pellets. The dyspnœa at first quickly increases in severity, the patient becoming exceedingly distressed and anxious, with face pale, or cyanosed, or livid; he gasps for breath, and endeavours to obtain it by bringing his extra-ordinary muscles of respiration into play. And now the inspiratory being much stronger than the expiratory musculature, the chest becomes fully distended but cannot be emptied, so that the air in the lungs is not sufficiently renewed, and partial asphyxia results. Such an attack, if untreated, may last two, or even six hours, or more.

The seizures may be compared with those of the other paroxysmal neuroses, migraine and epilepsy. They are generally admitted to occur much more commonly in those people of a neurotic type or inheritance, and the consequent instability, or irritability, of the respiratory centre is an important factor in their production. This type of dyspnœa is only compatible with a sudden diminution in the calibre of the smaller bronchioles, and this again can only be caused by contraction of the muscular coat, by turgescence of the vascular system, or by swelling of the mucous membrane with exudation into the lumen of the tubes. Of these, the first is undoubtedly the cause of true spasmodic asthma; the second, which is chiefly supported by analogy from the sudden swelling of the nasal mucosa in cases of so-called "hay-asthma," may be dismissed on anatomical grounds, for there is no such erectile tissue in the walls of the bronchioles, nor does the blood supply render it at all probable that a sudden turgescence could obtain, sufficient to give rise to such symptoms. With regard to the third possibility, the physical signs of the condition are altogether against the presence of an exudation in such quantity as to cause obstruction; there is often very little râle and slight expectoration, the constituents of which are found in other morbid states.

To return to the first explanation of the seizure, *i.e.*, that it is due to muscular spasm, some very significant experimental evidence, bearing on the pathology of asthma, is recorded in the *Transactions of the Pathological Society of London*, 1903, by Professors Brodie and Dixon. These observers, recognising the fact that anæsthetics paralyse the nerve endings in the bronchiole muscle, decerebrated the animals used by them by pithing, and

were then able to demonstrate constriction of the calibre of the bronchioles from stimulation of the vagus directly, by the injection of certain drugs, and also by obtaining reflex effects from stimulation of the central end of one vagus divided in the neck, and of the nasal mucous membrane. They found that the upper and posterior part of this membrane responded more readily to mechanical, chemical, or electrical stimuli than other portions of it.

It is evident, therefore, that spasm of the bronchioles can be produced in the laboratory by stimulation of the vagus. Clinically this vagal stimulation may be central, peripheral, or reflex. It is inconceivable that any gross lesion, or general vaso-motor change, should affect this particular nervous centre, without other closely neighbouring centres becoming involved; and morbid anatomy has failed to reveal any such lesion, so that it is fair to presume that the centre is organically intact, but functionally impaired. Peripheral excitation of the nerve endings might produce a constriction, and possibly some atmospheric conditions may give rise to such. Brodie and Dixon were unable to produce constriction by the direct application, or injection, of Charcot-Leyden crystals, or asthmatic sputum.

The strong probability is that the exciting cause is always peripheral, and the constriction of the bronchioles reflex. And this is supported by clinical experience, it being well known that such immediate causes as a distended stomach, a loaded bowel, a dilated heart, emanations from animals or plants, may produce an asthmatic attack. It is also well recognised that, in the great majority of cases, there is a definite history of neurosis, often hereditary, leading to a morbid hypersensitiveness, or instability of the nerve centres. In short, combining clinical experience with the experimental evidence advanced by Brodie and Dixon and others, it is practically certain that the true nature of spasmodic asthma is a reflex contraction of the muscle-fibres of the bronchioles, the predisposing cause being a deficiency in the stability of the respiratory centre, and the exciting cause a peripheral stimulation, which may be gastric, intestinal, cardiac, renal, nasal or bronchial, or may arise in any sensory organ, and is often of the mildest description.

Alexander Francis, in his book on asthma in relation to the nose, records remarkable results from cauterisation of

the septal mucous membrane. He believes that, in the asthmatic state, there exists a morbid connection between the nose and the respiratory centre, whereby the centre is maintained in such an unstable condition as to allow peripheral irritation to promote an asthmatic reflex. He states that the region involved, in the great majority of cases, is that part of the septum nasi, which lies opposite and immediately above the anterior third of the middle turbinated bone; and, further, that he has cauterised the mucosa several thousand times, that he has never in a single instance seen the slightest harm follow the operation, and in over 300 cases the patient has lost all sign of asthma, in many there being no recurrence in five or six years. With regard to prognosis, he finds that it is very much better when there is no sign of present nasal disease, or abnormality, than when the condition is associated with polypi, spurs, or hyper-sensitiveness.

Having arrived at a definite conclusion as to the pathology of the condition, the treatment resolves itself into permanently increasing the stability of the respiratory centre, and temporarily causing relaxation of the constricting bronchiole muscles during an attack.

In the first place, every effort must be directed towards improving the patient's general condition. As regards climate, each sufferer will probably have observed what particular variety suits him best; some are better in dry, others in humid climes; some on the hills, others in the lowlands; some, again, in cities, and others in the country. As a general rule, the sea-shore and damp soils should be avoided, and a warm sheltered situation selected. Mont-Dore-les-Bains, a mountain health-resort in Central France, 3,400 feet above sea-level, is much frequented by asthmatics. Here the nervous system is braced up by high altitude, hot spiral douches, and draughts of arseniated waters, while the bronchial mucous membrane, which, in chronic cases, is always secondarily affected, is treated by the inspiration of dense vapour from the waters. Bath treatment seems to have ather an injurious effect than otherwise.

A properly-regulated diet is essential; small meals at regular intervals, with but little meat, are often beneficial,

while a late evening meal must be strictly avoided. Gaseous beverages should not be taken, but there is no objection to alcohol, in moderate quantity, or at meal-times. Exercise in fresh air, avoiding fatigue, should be regularly indulged in. Drugs may be employed to lessen the instability of the respiratory centre, and arsenic, strychnine, and the bromides are each of service. Useful combinations are the arseniate of strychnia in $\frac{1}{30}$-grain dose in pill form, or $\frac{1}{32}$ grain of the hydrochloride of strychnine with $\frac{1}{100}$ grain of atropine, at first daily, then cautiously increased. Potassium iodide, in doses of 10 to 15 grains, combined with full doses of the tincture of lobelia, stramonium, or belladonna, once daily, has empirically been found to be of much service in allaying the frequency of the paroxysms. In addition, digestive troubles must be carefully attended to, and the daily action of the bowels strictly maintained.

As a prophylactic remedy, cauterisation of the nasal mucous membrane should be performed. Francis recommends that one side of the septum nasi should be painted with a few drops of a solution of 10 per cent. cocaine and 5 per cent. resorcin, applied on a pledget of cotton wool attached to a probe. He then draws a line with a galvano-cautery point from a spot opposite the middle turbinated bone, forwards and slightly downwards, for a distance of rather less than half an inch. The operation is repeated on the other side, in about one week's time, and, afterwards, on alternate sides, at intervals of ten days or a fortnight as occasion requires, a fresh spot being cauterised each time. This procedure should only be attempted during a quiescent period.

With regard to the immediate relief of a paroxysm, drugs may be rationally administered, with the intention of relaxing the constricting bronchiole muscles by acting centrally or peripherally. Thus, if there is reason to suppose that an overloaded stomach or bowel is causing the reflex, an emetic or enema should be promptly given; or if there is nasal irritation a five per cent. cocaine spray may be tried. Such drugs as chloroform, ether, and amyl nitrite, when inhaled, directly relax the muscle fibres, but the action is very temporary. More relief is obtained from the direct application

of atropine and the nitrites, and this is generally effected by the inhalation of the fumes from burning leaves of belladonna, stramonium, hyoscyamus, or blotting-paper soaked in a solution of potassic nitrate. Atropine sulphate may also be injected hypodermically, in doses of $\frac{1}{100}$ grain, repeated, but gives rise to unpleasant dryness of the throat and frontal headache, if enough is given to overcome the muscular spasm.

Of drugs acting centrally, morphia is pre-eminent; it may be given as the B.P. injectio hypodermica, minims 5, or preferably $\frac{1}{6}$ grain of the acetate, with $\frac{1}{100}$ grain of atropine sulphate. This rarely fails to gives relief, but cannot be entrusted to the patient for personal administration at the onset of an attack. In the same way, cocaine sprays are open to objection, and alarming heart-failure has occurred after such application. Paraldehyde in 2 drachm doses, combined with syrup of orange, or infusion of senega, is a very valuable remedy; it is quickly absorbed, does not depress the heart, and gives relief rapidly by acting as a hypnotic and sedative. The only objections to its use are, that it gives the breath an unpleasant smell for some hours after use, and that some patients cannot swallow it during the paroxysm.

Phenacetin and antipyrin are sometimes of service in full doses. They produce a slight hypnotic effect, and diminish sensibility to pain and the reflex excitability of the cord. Caffeine acts centrally as a stimulant, and peripherally in slightly relaxing plain muscle; it may be given as the citrate, in doses of 10 grains, or as a ready household remedy as hot strong coffee or tea. A good stiff hot brandy and water may also give temporary relief.

Adrenalin has been said to give relief, when 10 minims of the 1 in 1000 solution of chloride are injected hypodermically. Unless it gets into the circulation directly, it has a purely local action in constricting vessels; if it should be absorbed, its action is to raise the blood-pressure and quicken the heart, thus possibly raising the tonus of the medullary centres. Its indiscriminate administration is not to be recommended.

THREE BEST REPORTED CASES.

By D. L. DAVIES, M.D., M.S. (Lond.),
of Wisbech.

I.—AN UNUSUAL CASE OF MALIGNANT DISEASE OF THE TONGUE.

The patient was a healthy-looking widowed lady of 73, who for 20 years had had an affection of the tongue.

It began as a small lump underneath, and very slowly increased in size leading to fixation of the tongue; a deep longitudinal fissure also appearing on the dorsum of the organ. From this fissure several severe hæmorrhages occurred.

The condition was diagnosed as cancer by an eminent London surgeon, and removal advised. This was refused, and accordingly she was prescribed Chian turpentine, which she took regularly for many months.

Next a small lump appeared beneath the right side of the jaw and slowly increased.

Her speech was thick, and, on examination, the tongue was found to be bound down to the floor of the mouth, and there was a deep longitudinal fissure on the dorsum, but no definite ulceration or hardness. More recently several small elastic nodules developed in the skin of the scalp, one of which was ulcerated, the edges being firm and everted.

Small subcutaneous and cutaneous nodules next appeared over the abdomen, and in six months the whole trunk was extensively involved. The cutaneous nodules looked bluish. The liver became enlarged and irregular on the surface, and other masses, apparently peritoneal, could be felt in the abdomen.

She now lost flesh rapidly, was frequently sick, and could take very little nourishment. The growths rapidly increased in number and size. Troublesome piles appeared, and, without obvious cause, metrorrhagia. Death ensued from asthenia.

A limited post-mortem examination revealed extensive malignant disease of the liver and peritoneum.

Microscopic sections of scalp tumours and of subcutaneous nodules and liver showed them to be endotheliomatous.

2.—A CASE OF MALIGNANT DISEASE OF THE MEDIASTINUM.

The patient, a man of 24 years, complained of shortness of breath, cough, and wasting. His illness began with typhoid fever, in 1901, and was followed by pneumonia (left-sided).

When first seen, he had a very troublesome cough with thick yellow expectoration, occasionally streaked with blood. His shortness of breath was marked on exertion. He was also troubled with flatulence, and occasionally vomited after food. He was pale, emaciated, and looked ill.

Physical Examination. Chest.—There was marked flattening and retraction at the left apex, the intercostal spaces were hollowed, and dilated veins were present in both axillary regions. The physical signs were on the left side, and pointed to consolidation of the lung; dulness and absent breath sounds below the apex, the cardiac impulse being in its normal position.

Abdominal examination was negative.

The urine contained a trace of albumen.

A week later the liver was felt 2 inches below the costal margin, and a systolic cardiac apical murmur had developed, but disappeared later.

Three weeks later, numerous petechial spots appeared over the abdomen. The liver reached down to the umbilicus, being smooth and firm. Vomiting was constant after food, the vomit being neutral or alkaline. Food seemed subjectively to be arrested at level of second rib, though a medium-sized œsophageal sound reached to the stomach.

By the end of the fourth week there was jaundice, the petechiæ were increasing, and the patient gradually sank and died 18 months after the pneumonia.

P.M.—There was a malignant growth of the posterior mediastinum, radiating forward into the left lung, which was almost solid. There was some serous effusion into both pleural cavities. Secondary growths present in heart, pericardium, and liver. The œsophagus and aorta were surrounded and constricted by growth.

Microscopical examination proved it to be a large round-celled sarcoma.

3.—A CASE PROBABLY OF MENINGITIS.

The child, a healthy-looking boy of 4 years, was seized with convulsions on June 28. He was semi-conscious, and the right side of the face, the right arm, and, to a less degree, the right leg were in a state of clonic spasm. There was conjugate deviation of head and eyes to the right. The left side was not affected. The face was flushed and the teeth firmly clenched. Axillary temperature, 102·6°. Pulse, 120. He had always been healthy, and there was no history of tuberculosis in the family.

On June the 25th, he had complained of headache, and was sick once. He seemed restless and lay about. On the 26th, he seemed bright, but still had headache, and objected to a bright light. He remained listless until the convulsion occurred. He had been constipated since the 25th. Examination of the various regions and organs was negative, and there was no rash anywhere.

The convulsion was only relieved by chloroform, but the clonic movements returned in the right hand as the effects of the chloroform wore off.

Four hours later, the child became more unconscious, but the conjunctival reflexes were still present. Conjugate deviation of the eyes had disappeared. Temperature, 111°. A tepid bath gradually cooled down brought the temperature to 99°, but it rose later to 102°.

There were no more convulsions.

June 29, there was now a flaccid paralysis of right arm and leg, and deepening coma. No squint, pupils dilated, and eyeballs rotated up. No retraction of head or rigidity of neck. Examination of the ears was negative. The veins of the left eye were much larger and darker than those of the right, no optic neuritis and no choroidal tubercles were seen.

The child died on the 30th, but no post-mortem was obtained.

SOME FAMOUS QUACKS.

II.

JOHN ST. JOHN LONG.

ONE of the most notorious quacks who battened on the ignorance of the British public in the last century was John St. John Long. In the *Dictionary of National Biography* he is stated to have been born at Newcastle, Co. Limerick, whilst George Tate, in his *Observations upon the System of Mr. John St. John Long*, says that his birthplace was Mallow, in the county of Cork, and in J. Cordy Jeaffreson's *Book about Doctors* he is said to have first drawn breath in or near Doneraile. He was the second son of John Long, basket maker and jack of all trades, by Anne St. John. He was born in 1798, and was bred to his father's various occupations. He early showed some talent for drawing, and, in 1816, some charitable person enabled him to go to Dublin, where he attended the school of design, and had some intercourse with the painter, Daniel Richardson. After two years spent in Dublin he returned to his native place. There, according to Tate, he set up as a house and sign painter, and did a thriving business; but the *Dictionary* describes him as earning his living by giving drawing lessons. He also painted some pictures of still life, and attempted both landscape and portrait painting. After a time he moved to Limerick, where he set up as an artist, and thanks to the ladies of that city, who were captivated by his sham brilliancy, he achieved considerable success. He became so popular that he was encouraged to try his luck in England. He managed to obtain some introductions into a few respectable houses, and obtained employment from Sir Thomas Lawrence as colour grinder and assistant in his studio. Later he was wont to boast of his intimacy with the great artist; and he got himself elected a Member of the Royal Society of Literature, and also of the Royal Asiatic Society. He eked out a scanty income by colouring anatomical drawings for the professors and pupils of

one of the minor surgical schools of London, thus acquiring a very superficial knowledge of anatomy. This seems to have led to his discovering in himself a latent gift of healing. He professed to have invented a liniment which had the property of distinguishing between healthy and unhealthy tissues, and which cured gout, rheumatism, palsy, and consumption. He rubbed this preparation into the back or bosom, and if the part was sound, it was as harmless as water; but if there was disease underlying, a sore was produced. This sore was the outward and visible sign that the inward disease was being expelled. Long treated it by applying cabbage leaves—the panacea of that old quack, Cato the Censor—and letting it run its course; when it was healed he pronounced the patient to be completely cured. Another method of treatment used by him was inhalation. He compounded a mixture, and placed it inside a large case, described as being something like an upright piano. In the sides of the case were openings in which pipes were fixed through which patients inhaled the vapour.

Long started in the healing trade in 1827, in Howland Street, Fitzroy Square; but dupes came in such numbers that he soon set up his shrine in Harley Street. People of every rank and every age flocked from all over the kingdom to consult him; and every day from 8 a.m. to 4 p.m. the street was blocked with the carriages of those seeking counsel of the oracle. So great was his business that he was unable to deal with it, and after awhile he would only treat selected cases. His plan was to detect, as with the eye of a seer, signs of latent disease in a perfectly healthy person; he then worked on the fears of the victim and on the feelings of those about him so that consent to undergo a course of treatment was easily extorted. Long used to move amongst his patients as they crowded his rooms to inhale, and listen to their talk amongst themselves; and every scrap of gossip he overheard from them about their illnesses and constitutions and those of their family was carefully treasured up, and turned to account later. It was believed he made enormous sums of money year by year. A writer in the *Gentleman's Magazine* for 1843 says:—

"I had some previous knowledge of him, and in 1830 he showed me his pass-book with his bankers, Sir Claude Scott

and Co., displaying a series of credits from July, 1829, to July, 1830, or a single year's operations, to the extent of £13,400."

It is only fair to say that he often took no fees.

In spite of his enormous practice, Long found time to go a great deal into fashionable society, where he was made much of by influential friends. He was not a handsome man, being tall and slight, with a thin, firm face; but he looked refined and intellectual, and he had an imposing carriage and ingratiating manners. His voice, though hesitating, was very musical. He was of a very impulsive temperament, but very temperate in his habits. He was a splendid horseman, riding very beautiful horses, and hunting regularly. Women were his chief partizans, and it is said he could easily have found a bride among the high-born beauties of his day. But he preferred to keep the freedom of single life. J. Cordy Jeafferson, in his *Book about Doctors*, says:—"Although he was received with peculiar intimacy into the privacy of female society, scandal never even charged him with a want of honour or delicacy towards women, apart from his quackery. Indeed, he broke off his professional connection with one notorious lady of rank rather than gratify her eccentric wish to have her likeness taken by him in that remarkable costume—or no costume at all—in which she was wont to receive her visitors." Years after Long's death there were still women who believed firmly in him, and cherished his memory with reverence and affection as an innocent man wrongfully accused and cruelly persecuted.

In the summer of 1831 came the crisis of the quack's successful career. Two Irish ladies, named Cashin, came to London to consult him. Ellen, the younger, was extremely delicate; a patient of Long's who saw her at his house, said she appeared to be at death's door, and the elder girl did not look healthy. Long himself pronounced the younger to be in the last stage of consumption; yet he advised her to undergo the ordinary course of inhaling and rubbing. The Cashins were a consumptive family, and had recently lost a brother and another relation from that disease. The elder girl, Catharine, was soon persuaded by Long that, unless she underwent the same treatment as her sister, she would fall into a rapid

consumption, and placed herself in his hands. On August 3 the corrosive liniment was rubbed over her back and shoulders. Violent inflammation was set up; instead of healing, the wound became hourly darker and more unhealthy looking, and the patient was unable to bear the cabbage leaves upon it. Eleven days after the application the girl was in a state of extreme pain and exhaustion, and suffering from continual sickness. Long treated these symptoms lightly and ordered her a tumbler of mulled wine. The following day he called again, and offered to dress the wound. The landlady of the lodgings where Miss Cashin was staying stated at the inquest that she would not suffer him to touch her, and exclaimed: "You shall not come near me, Mr. Long; it is horrible, you are killing me." Long assured her that her pain would be of short duration, and that in a few days she would be in better health than ever in her life before; but about six in the evening Benjamin Brodie was sent for, and found on the poor girl's back a sore as large as a plate, with a portion as big as the palm of his hand in a state of mortification. Within 24 hours the unfortunate girl was dead.

An outcry now arose from every corner of the kingdom that the quack should be punished. The prosecution was started by Thomas Wakley, the Editor of the *Lancet*. Long, in a letter to Sir Astley Cooper, written for him by one of his partisans, maintained that the accusations brought against him were made in a most malignant spirit, not from a sense of public justice, but to ruin an innocent man, who was too successful and becoming too famous to please the doctors of the country, who feared in him a formidable rival. His miraculous cures were famed over the country, and the profession were consequently troubled for their very existence; with regard to Miss Cashin's death, he looked upon himself as "more sinned against than sinning."

An inquest was held. On the first day, before the body had been opened; the jury would at once have returned a verdict of manslaughter, had it not been for the intervention of Mr. Porter, who had formerly been surgeon-general at Jamaica for twenty-two years. The evidence was conflicting and does not give a very high idea of medical knowledge of the time. Benjamin Brodie declared on oath that mortification

and sloughing had commenced on Miss Cashin's back, whilst Dr. Alexander Thomson, Bachelor of Physic, who only saw the body four or five days after death, saw no slough. In a letter to the coroner, Brodie says: "When I said there was a slough on the back, I meant that a portion of the skin was dead or mortified." The following account of what was found at the post-mortem examination was given by Dr. Thomson:—

"The left cavity of the thorax contained about 1½ ozs. of sanious serum, but neither its costal diaphragmatic or pulmonary portion was traversed by vessels containing red blood. The lungs of this side readily collapsed, and expelled the whole of the air, and appeared of a dark-greenish blue hue exteriorly, and interiorly of a purple dark port-wine hue, apparently from venous congestion; this lung had at its superior part a small adhesion connected with a cicatrix of the lung, arising from an old attack of bronchitis. This cicatrix contained, however, two small cavities filled with purulent fluid. The lungs of the right side, while internally they were of the same hue and appearance as those of the left, were everywhere in close adhesion with the mediastinum diaphragm and thoracic parietes, through the medium of the pleura, which was connected by recent but organised adhesive bonds traversed minutely by longitudinal and parallel vessels carrying red blood to the costal phragmatic and mediastinal pleura. The lobes of the lung were adherent to one another by more ancient adhesions, and at its upper part it contained a cicatrix similar in form, appearance, structure and magnitude, which was about that of a walnut, to the cicatrix of the left lung, but containing no recent purulent matter. The whole of the lining membranes of the heart were much and deeply stained with the blood, which in all the cavities of the heart was in a state of effervescence and decomposition. The substance of the heart was unsually pale and yellowish, buff in hue, and the whole more flaccid than usual. The appearances internally in the abdomen and thorax were precisely similar to those I found in the case of a person who died at Chelsea from the effects of an over-dose of colchicum, in a mixture containing 6 ozs. instead of 6 drachms. Any medicine containing a preparation from the same class of plants would produce a similar effect." It appeared, however,

that Miss Cashin could not have been given anything of this kind, as Long only once gave her medicine, which she immediately vomited. The landlady, at his orders, gave her rhubarb and magnesia. Brodie's prescription, which was read by Mr. Foukes, who had compounded it, was as follows :—

6 scruples of the carbonate of potash ;
10 drops of the tincture of opium ;
3½ ozs. of mint water ;
3 drachms of the spirit of nutmeg, with lemon juice ;
to be taken in the course of 36 hours.

Another mixture was also given by Brodie every 6 hours, containing :—

1 scruple of the carbonate of potash :
1 drop of laudanum.

Dr. Thomson further stated : "I presume the wound on the back was made to effect counter-irritation, which is a common practice among the junior branches of the profession." He went on to say : "I never would have produced on the patient such a sore, unless I wished to kill the patient. I should have feared for the life of the patient."

On the third day of the inquest, after a further *post-mortem* examination, Dr. Thomson mentioned that neither he nor the other doctors found disease in the spine or head, which were very healthy. Asked by the coroner what caused death, he answered, "I would say, that the death arose chiefly from the slough on the back, the state of the stomach, and the state of the pleura." Mr. King gave evidence that the wound had the appearance of being produced by a scorching heat, as though a red hot iron had been held for about a quarter of an hour very near the skin. It was as large as the crown of a hat, and if he had seen the sore before death he said, "it would have roused me to the most efficient mode of treatment." Asked if mortification had set in, he answered in the affirmative, adding : "Here, we understand in this case, a complete destruction of the skin." Yet it should be remembered that Dr. Thomson had seen the body two days before the other doctors, and even then it was in an advanced state of decomposition.

Mr. Wildgoose, who next gave evidence, echoed Dr. Thomson's sentiments, and alleged that the patient was consumptive,

giving as a reason that they had found a cicatrix. Dr. Hogg, who followed, said: "The body in itself was not emaciated, but symmetrical, muscular, and in every respect well formed. Upon removing the skull cap, the brain presented an unusual firm and healthy appearance. Portions of it were removed and examined as to its structure, and we were still more surprised at the unusual firmness of it throughout, and healthy appearance." Asked what death was caused by, he said: "I should say that the violence done to the nervous system here was quite sufficient to cause death, particularly in a nervous and delicate young lady."

Dr. Goodeve was next called. The other doctors had stated that there was a discoloration of the spinal cord opposite the sore. Questioned concerning this, Dr. Goodeve deposed: "It was nearly opposite the lower end of the wound: it was all discoloured, but this was more discoloured than the other." Asked if the spinal marrow was itself discoloured, he replied, Not at all, and that it was difficult to tell if the discoloration was due to internal or external causes. He deposed that the wound in the back was, to his thinking, made by a very powerful caustic or acid, but it was impossible to say by what. Asked if the wound caused death, he said: "The mere wound would not cause death, unless accompanied by other symptoms. It might be sufficient to cause death, but I should think not in this instance." Asked if he could produce such a wound on the back of any person without endangering life, he answered: "Yes, certainly, I think I could. . . . A common burn. It depends entirely upon the state of health of the patient." Later he declared: "As far as I could see, it partook very much of the character of a burn; not made perhaps with fire itself, but some other application which produces the same result. . . . Some surgeons might choose to do it." From the partial examination that he had made of the body, it was difficult to assign a cause for death; but seeing no other cause, he was obliged to conclude that death was caused by the "wound and its consequences." The evidence of the medical witnesses, though not very convincing, was sufficient for the jury, who brought in a verdict of manslaughter. Long's fashionable friends used every effort to prevent the law taking its course. The warrant for his

apprehension was mysteriously delayed, and the affair would doubtless have been hushed up, but for the energy of Mr. Wakley. On October 3, Long was placed in the dock at the Old Bailey. Crowds of his admirers, male and female, came to listen to the case, and to testify in his favour. Their evidence is interesting as throwing light on the psychology of the people among whom quacks find their natural prey. A young lady stated that she had been cured of consumption by Long's liniment, because before she had been rubbed she had had a bad cough, and after using the liniment the cough left her. A gentleman testified that he had suffered for years from gout, which attacked him at intervals of one to three months; he was convinced that Long had cured him, as he had had no attack for five weeks. Another suffered from violent headaches, and upon the application of the lotion the humour which caused the headaches came away in a clear discharge. The Marchioness of Ormond stated on oath that she knew Miss Cashin's back was rubbed with the fluid she and her daughters used; yet she admitted she neither saw the back rubbed, nor the fluid with which it was rubbed taken from the bottle. Sir Francis Burdett also testified to the harmlessness of Long's treatment; but the value of his testimony may be gauged by the fact that Mr. Wakley, asserted in the *Lancet*, that Burdett had asked Long if his lotion could give the Marquis of Anglesea a leg, in place of the one he had lost at Waterloo. Long giving an encouraging answer, the liniment was applied, and succeeded in producing a big toe! All through the trial the judge, Mr. Justice Park, showed the strongest bias towards the prisoner, frequently telling the jury there was no case against Mr. Long, and he summed up strongly in his favour. In spite, however, of the partial judge and the crowd of fashionable witnesses, the jury returned a verdict of manslaughter. Long was fined £250, and to be imprisoned till the fine was paid. He at once paid the fine, left the court with his fashionable friends, and drove with Lord Sligo to the West End.

Miss Cashin's death was quickly followed by another fatality of the same kind. A Mrs. Lloyd was rubbed with the liniment, which made a sore extending from the armpits across the chest in one direction and from the collar bones

to under the nipples in the other. She was removed from Long's care, but it was too late. The soft parts covering the breast bone were black and dead, and there was great sloughing. She died within a month from the day she had first consulted Long. An inquest was held, and a coroner's jury found Long guilty of manslaughter. He was again tried at the Old Bailey; this time, however, he was acquitted.

These exposures did not at all lessen his popularity, though the *Times*, the *Lancet*, and all the other respectable papers did their best to open the eyes of the public. Long's adherents believed in him as a martyr in the cause of science, a part which he played to perfection, modestly comparing himself to Galileo, Jenner, and Harvey. He published an elaborate defence, reinforced with testimonials from grateful patients, such as Lord Ingestre, Lady Harriet Kavanagh, the Marchioness of Ormond, the Marquis of Sligo, and the Countess of Buckinghamshire. He accuses the most eminent physicians and surgeons of the day of conspiring to crush him through jealousy, and maintains that Brodie had killed Miss Cashin by the saline draught he had given her. He insists that if his victims had continued his treatment, they would have lived.

Long retained his vast practice to the end of his life, which was not, however, long delayed. He died on July 2, 1834, of consumption, at the age of 37. The *Gentleman's Magazine*, in a short account of his life, says that he declined to allow himself to be treated by his own method. He was buried in Kensal Green Cemetery, where his admirers raised a costly monument to his memory, bearing the following inscription :—

"It is the fate of most men to have many enemies and few friends. This monumental pile is not intended to mark the career, but to show how much its inhabitant was respected by those who knew his worth, and the benefits derived from his remedial discovery. He is now at rest, and far beyond the praises or censures of this world. Stranger, as you respect the receptacle of the dead (as one of the many who will rest here), read the name of John Saint John Long without comment."

Comment, indeed, is needless.

NOTES FROM FOREIGN JOURNALS.

SOME PECULIARITIES OF TABES AND ITS MERCURIAL TREATMENT.

Lecturing at the Hôpital de la Pitié, Babinski showed a young woman, very nervous and subject to hysterical attacks, who for nine years had suffered from paralysis of the third nerves. An oculist had diagnosed hysterical paralysis, but such interpretations cannot be relied upon, for hysteria does not give rise to paralyses limited to peripheral nerve regions.

The origin of the paralyses of the third pair is often specific, and they forebode the beginning of tabes; it was so in the present case. The paralysis could not be put down to arterial atheroma, atheromatous paralyses often last one, two, or three months, but the arteries of this patient were not atheromatous.

The patient at first refused to have specific treatment, but eventually submitted to it, and her paralysis disappeared. Some other symptoms were present. She walked well, was not ataxic, but had had some lightning pains. She had pupillary immobility. Argyll-Robertson's symptom, which, as Babinski has pointed out, often indicates a chronic specific meningitis. This in fact, as examination of the cerebro-spinal fluid shows, discloses lymphocytosis of the clearest kind in cases in which the Argyll-Robertson pupil is present. Although the paralysis of the third had disappeared in the patient, yet, on the other hand, there could be noticed paralysis of the right sixth. The eye-ball cannot be moved to the right, and in addition there is a very slight facial asymmetry. Paralysis of the sixth is known to be common in syphilis and in tabes, and may be nuclear or peripheral, the differentiation can be determined by certain symptoms.

When the paralysis is central, it is often associated with facial paralysis, because of the close proximity of the two centres. In the case under discussion, a trace of facial paralysis is present, but neither hemiparesis, hemiplegia, nor exaggerated tendon-reflexes, which are usually present in nuclear paralysis of the sixth pair. As well as these, the cerebellar fibres lying close by, may be involved in turn, and give rise to nystagmus—but this is not present in the patient. A last argument, proving that the paralysis is not of central origin, is that the other eye is not affected at all.

Tabetic symptoms are usually asymmetrical, for the pupillary affection, the laryngeal troubles, and trophic disturbances (zona and perforating ulcer) are, as a rule, found to be unilateral. The pains are often stronger on one side, and the patellar reflexes are unequally affected. The patient has a weak patellar reflex on the right side, but it is well marked on the left; while the Achilles reflex is well marked on the right, and has disappeared on the left side. The pathological anatomy of tabes explains this asymmetry of the lesions, for the disease really consists of a chronic specific meningitis, which is proved by the thickening of the meninges at the level of the posterior parts of the cord, and also by the presence of lymphocytosis. The first parts affected in tabes are the nerve radicles, then the posterior roots,

and from these spreads the secondary degeneration of the posterior columns of the cord. These lesions are never exactly similar on each side.

Another peculiarity is in connection with disturbances of sensation. In tabetics, there is frequently found a dissociation of sensation, inverse to that found in syringomyelia. In the latter, touch is perceived, but the sensations of heat and cold are absent; in tabes, on the contrary, the sense of touch is lost, but the sensations of heat and cold are retained. Another patient showed a similar disturbance of sensation at the level of the epigastric region. Other sensations are often affected in tabes, anæsthesia of touch is accompanied by anæsthesia of the muscular sense, so that when the eyes are closed, the patient has no idea of the position of his limbs.

With regard to treatment, the first question is:—What is the actual effect of mercurial treatment? Babinski has never obtained good results, except under the conditions of sufficiently large doses and length of treatment.

Out of a 100 tabetics, about 30 will deny previous syphilis, but the same proportion of denials will be found in cases with syphilitic lesions, as to the origin of which there can be no doubt whatever. When medical men are attacked with tabes, or general paralysis, the avowal of previous syphilis is always made. In religious communities in which syphilis is absent, tabes and general paralysis do not exist. Finally, no tabetic has ever contracted syphilis. Leloir's case, which he recorded as disproving this assertion, was suffering from alcoholic pseudo-tabes and not from true tabes.

Practitioners, who are opposed to mercurial treatment, have made the most of the frequently stationary course of the disease and its possible improvement apart from the treatment. That is true; great individual differences are met with in this respect, but it in no way lessens the fact that, formerly, tabetics, not treated by mercury, did not improve so steadily as they do nowadays. Babinski, who sees over 300 tabetics in a year, has been obliged to submit to the evidence, and now asserts confidently that mercury is the most effectual treatment of tabes. It stops serious symptoms, like atrophy of the optic nerve, and makes the pains disappear. Two patients, now in hospital, who have for some years been in a wretched condition with pains, ataxia, and atrophy of the papilla, have found their symptoms disappear in an astonishing way. Of course, sight has not been restored to the blind eyes, but the threatened eyes have had the feared result averted. One of these patients has had 180 injections of calomel, and the other 100. The dose of calomel is gr. $\frac{3}{4}$, and an injection is given every eighth day. That makes a treatment extending from two to three years. It is sufficient to watch the effects of the treatment, to suspend it from time to time in the quiet stages, to lessen the doses if necessary, and to resume them later.

Patients must be warned of the length of the treatment, and that for some weeks the injections will bring about little or no improvement. (*Journal des Praticiens*, June 30, 1906.)

THE CONTAGIOUS STAGE OF SCARLATINA AND ITS PROPHYLAXIS.

Surgeon-Major Boisson gives in the *Annales d'hygiène publique* (March 1906) the results of his observations of an epidemic of scarlatina, which

occurred at the Ecole de Santé Militaire of which he is in charge, and draws from these some important conclusions as to prophylaxis.

The commonly received ideas as to contagiousness are in need of revision for there is no doubt that the conclusions arrived at by Lemoine, and continued by Sevestre, Mozard and others, must become the fundamental principles in dealing with the prophylaxis of scarlatina. These authorities maintain that scarlatina is contagious from the beginning of the period of invasion up to the pre-eruptive phase, as soon as the first throat symptoms have made their appearance. The agents of contagion are the bucco-pharyngeal products; contagion starts from the throat and it is there that it persists longest, just as in the case of Loeffler's bacillus in recent cases of diphtheria.

The more or less delayed transmission of contagion by scales is proved by a number of facts, but it must be admitted that even during the period of desquamation, the materies morbi has been transmitted directly, or indirectly, by the bucco-pharyngeal products. The angina of scarlet fever is the real disease, the eruption is merely an epiphenomenon. That scales may be susceptible of becoming the receptacle of germs is certain, but a point of prime importance has been obtained, that above all it is from the bucco-pharyngeal cavity that the infecting agent of scarlatina emanates, and it is consequently in that place that it must be pursued and attacked.

Boissier's observations have established another fact, which is of the greatest importance for prophylaxis. Within a few hours the incubation of scarlatina lasts four days. This definite period must form the basis of all measures for prevention by temporary isolation and of special supervision to which it is necessary to submit a group suspect of contagion.

It follows from this that every case exposed to contact with scarlatina must be isolated for four days, and during this time, the throat must be carefully examined at least twice a day. The adoption of these methods at the Ecole de Santé enabled the authorities to prevent the full development of the epidemic.

Local antiseptic measures were also adopted. All the scholars were made to use a gargle of lysol in 1 per 1000 solution. A medical officer of Lyons garrison has greatly praised the use of permanganate of potash in 1 per 1000 solution as a preventive. Neither of these, in Boisson's opinion, is equal to iodised water, prepared by the tablets of iodide of potash and iodate of soda and these of tartaric acid, as proposed by Vaillard for the purification of drinking water on active service; but, in this case, the addition of a tablet of hyposulphite of soda must be omitted, as this is added for the purpose of removing the iodine from the water before use.

The small amount of iodine does not injure dentition in the least, for tincture of iodine is largely used nowadays in dentistry, particularly against alveolar and gingival infections.

Rooms should be disinfected by a free use of a spray of formol solution (2·5 per cent.), as recommended by Vaillard. Boisson disinfected, in this way, the living quarters of the scholars as well as the class rooms, library, play-rooms, etc., used by them. In all there was a total of 1,600 cubic metres to disinfect, and this was carried out at a total cost of 30 francs. Those employed on the work of disinfection did not experience any lasting inconvenience from the action of the formol vapours on the conjunctivæ

and respiratory passages. The advantages claimed for disinfection by formol spray are cheapness, complete harmlessness, and thorough efficiency.

THE TREATMENT OF ANEURYSMS OF LARGE VESSELS.

Lancereaux publishes a paper on this subject in the *Revue de thérapeutique* of 1st July. The first part of the paper is devoted to a consideration of the ætiology and pathogenesis of the disease, and the conclusion arrived at is to the effect that general arterio-sclerosis, or endarteritis, is only very exceptionally followed by aneurysms of the large vessels. The pathogenic factors in these lesions are attacks of periarteritis, which invade the vessel from without inwards, and end by causing perforation of the elastic coat of the artery. Apart from trauma, these attacks have an infectious origin, and, so far as is known at present, the infection is either tubercular, syphilitic, or malarial.

Treatment is therefore preventive and curative. The former will vary with the cause and nature of the lesion, and is of less efficacy in tubercular and malarial cases, but of undoubted benefit when the cause is syphilitic, in which case mercurials and iodides will be used with effect. The chronic cachectic stage of malaria is quite uninfluenced by quinine, but, when sclerosis is in an early stage, this may be materially influenced, and even stopped, by giving iodide of potash in large doses (half to one drachm).

When once an aneurysm has formed, it is impossible to restore the wall of the artery, so that there is no alternative but ligature of the vessel, or strengthening the walls of the aneurysmal sac by inducing coagulation of the blood in the sac. In the case of the aorta and the large vessels, the former is out of the question, so that one resource only remains.

Lancereaux's experience of the treatment by hypodermic injection of gelatin-serum goes back to 1899, when it was first introduced by Paulesco and himself, and he asserts, on the strength of his observations, that the gelatin is absorbed, a fact which at first was called in question, and that the clot in the sac does not give rise to embolisms, as was suggested. The unfortunate occurrence of tetanus cannot be attributed to the method, but is due to faulty preparation of the serum. In his own practice, out of several hundred injections, tetanus has never occurred, because the gelatin used has always been carefully sterilised, which can be done without causing decomposition. The strength used is $2\frac{1}{2}$ to $3\frac{1}{2}$, or even 5 per cent. of gelatin, in normal salt-solution. Of this serum, 200 grammes are injected into the buttock every five or six days. Absorption is, as a rule, complete in 48 hours, and is not followed by any inflammatory reaction. Originally the injections were found to cause a temporary rise of temperature, but this has not been noted since the method of preparation of the serum has been improved by stricter attention to sterilisation of everything concerned. After four to six injections have been given, the pains caused by aneurysms of the first part of the aorta are allayed, and digestive troubles, due to aneurysms of the upper part of the abdominal aorta, cease. These facts have been noted in every one of the cases under treatment, and are not, therefore, a mere coincidence.

Lancereaux gives notes of three cases, the most recent under his care,

all of which present interesting features which tell in favour of the treatment. The first is that of a lady of 40 years of age, who had suffered from malaria some years before, and who was the subject of an aneurysm of the upper part of the abdominal aorta, about the size of a large orange. After fourteen injections of 3 per cent. gelatin-serum, the tumour was hard and not expansile. Twelve months later, symptoms appeared pointing to an aneurysm of the descending part of the aortic arch, the tumour was diffuse and prominent on each side of the sternum, with expansile movements. The latter ceased after a course of three months, during which twenty injections were given. The patient has since remained well and in good health. The second case is that of a mason, 54 years of age, with old malarial history and recent traumatic (heavy blow on shoulder). There was an aneurysm of the first part of the aorta, the pulsatile tumour presenting in the supra-sternal notch, and to some extent displacing the right clavicle sub-dislocation of sterno-clavicular joint). The pains ceased after ten injections, and the pulsations after thirty. Two years later, after a violent effort, the pains reappeared, and a pulsating tumour was visible to the right of the sternum. The injections were resumed, and, after six had been given, the sac began to harden. The expansile movements have decreased, but, as pulsation remains, this patient is still under treatment. The third case is that of an aneurysm of the ophthalmic artery, above the central artery of the retina. Causation traumatic. The patient was the subject of exophthalmos, diplopia, and some disturbance of vision. The vessels of the fundus were healthy, except for a slight thickening of the veins. Injections of gelatin-serum were given every fifth day, and, after the seventh, the globe of the eye had perceptibly gone back into the orbit; after the twenty-eighth, more than half the globe was back; and, after the thirty-fifth, the eye was hardly more prominent than the fellow; there is clear vision and no diplopia.

This method of treatment has been proved to be of use even in the most desperate cases, in which the sac has perforated the bony wall of the thorax, and is prominent under a thin and outstretched layer of skin. Rest in bed is not a necessity. Lancereaux commends it for use in all cases in which surgical treatment is either impossible, or too risky. Properly prepared, the serum is without danger, and there are at present no other means of stopping with certainty the progress of these grave disorders.

COLLYRIA FOR OPACITIES OF THE CORNEA AND OF THE LENS.

Bourgeois recommends the use of the following to disperse these opacities. Benzoate of lithia in solution dissolves phosphate and carbonate of lime, which salts are frequently found precipitated in leucomata of the cornea.

℞ Lithii Benzoatis - - - - - gr. x.
Aq. destill. steril. - - - - - ℥ ss.
Misce. Fiat collyrium.

"Two to four drops to be placed in the eye twice a day."

An improvement quickly follows, but a complete cure is sometimes a lengthy procedure.

Iodide of potassium is used for opacities of the lens:—

℞ Potass. Iodid. - - - - - gr. v.
Aq. destill. steril. - - - - - ʒ ss.
Misce. Fiat collyrium.

"One or two drops to be used twice a day."

If necessary, the eye may be washed out beforehand with a 1 per cent. solution of cocaine.

This treatment will check the growth of a cataract in its early stage and its action is the more marked, the younger the patient is. (*Revue de thérapeutique.*)

CARBO-GASEOUS BATHS IN MITRAL CONSTRICTION.

These baths have been used for some years with success in the treatment of different cardio-vascular conditions. They have a tonic action, slow, but lasting, upon the myocardium.

Heitz, in the *Archives médico-chir. du Poitou*, confines his remarks to patients suffering from uncomplicated mitral stenosis. His observations have been made upon those, in whom the lesion is well compensated; upon those, who suffer more or less from their affection without alteration of their general health, and who are only in the early stage of cardiac insufficiency; upon those, who have reached the stage of hyposystole: and finally upon those, in whom the lesion is not compensated.

From the observations obtained from these different varieties, he concludes that mitral constriction can be treated with advantage by carbo-gaseous baths at the period of simple cardiac insufficiency, or even at the beginning of the stage of hyposystole, but from these he excepts patients in whom the symptoms appear at puberty, in which case prognosis is always grave. In order to maintain the effects of this "cure," special care is necessary to prevent the return of the causes of the interruption to compensation. Even in the favourable stage, however, there are patients with stenosis, for whom the "cure" is contra-indicated, the association of stenosis with great mitral incompetence is of evil portent.

Among the symptoms which forbid this treatment must be noted signs of auricular thrombosis (cyanosis of lips and extremities), repeated hæmoptysis, a largely dilated right ventricle with hepatic congestion, anterior emboli, malleolar œdema, and albuminuria with cylindrical casts. It is sometimes difficult to lessen the dyspnœa, but all the other symptoms are, as a rule, considerably benefited, being, in fact, sometimes completely effaced by the action of these baths, which offer one of the best therapeutic methods at our disposal for the fight against cardiac insufficiency.

DIETETIC TREATMENT OF GRAVES' DISEASE.

Konrad Alt maintains that a diet, which takes into account all the factors of nutrition, can give brilliant results in this disease. The metabolic processes, in the subjects of this affection, are characterised by exaggerated oxidations, as in the case of hyperthyroidism, and it is, therefore, possible, by appropriate feeding, to prevent loss of strength, and to obtain increase of weight. Two facts must not be forgotten in making out a diet, first, the frequent occurrence of alimentary glycosuria (which can be produced in healthy subjects by giving large doses of thyroid substance), and

the consequent limit of toleration for carbo-hydrates, so that the loss of calories cannot be replaced by giving carbo-hydrates. In the second place, œdema is not uncommon in these patients, and is due to renal insufficiency and alteration in the chloride exchanges. Every one of Alt's patients showed a very marked degree of renal inadequacy, and eliminated chlorides imperfectly. Saltless diet, chiefly milk, was given from the beginning of the treatment. Dechloridisation was hastened by the use of aerated distilled water. Once the œdema had disappeared, the heart was found to have benefited considerably, so far as the pulse and the subjective troubles were concerned. Every patient but one had alimentary glycosuria, and lost an exaggerated amount of phosphorus, this loss was made up by suitable doses of protyline,

The diet adopted contained, therefore, a restricted quantity of carbo-hydrates, but, on the other hand, proteids and fats preponderated, the fats being given in the form of milk, cream, and saltless butter. Under the influence of this diet, the patients increased in weight very materially, the symptoms of the disease retroceded, and organs, hitherto inadequate, performed their functions very much better. — *Munch. med. Woch.*, 12 June.

FOR DYSMENORRHŒA.

In the *Formulaire de thérapeutique* recently published in Paris, O. Martin recommends the following prescription as being extremely useful in the dysmenorrhœa, or the menstrual pains of women who are plethoric, or arthritic:

℞. Tinct, Piscidiæ Erythrinæ
Tinct. Viburni Prunifolii
Tinct. Valerian. - - - - - āā ʒvj.
Tinct. Asafœtidæ (vel Tr. Pulsatillæ) - - ʒiij.
Liq. Ammon. Acetat. - - - - ad ʒiv.
Misce. Ft. Mist.

"One teaspoonful to be taken in a wineglassful of water (sweetened) and repeated every hour until relief is obtained."

For dysmenorrhœa and the lumbar and uterine pains of young women the following should be employed:—

℞. Tinct. Valerian.
Tinct. Piscidiæ - - - - āā ʒiss.
Tinct. Pulsatillæ - - - - - ʒiij.
Liq. Ammon. Acet. - - - - - ad ʒiiij.
Misce. Ft. Mist.

"One teaspoonful to be taken in half a tumblerful of sweetened water, and repeated every hour for three doses." (*Journal de médecine et de chirurgie.*)

Reviews of Books.

A Text-Book of Materia Medica for Students of Medicine. By C. R. Marshall, M.D., Professor of Materia Medica and Therapeutics in the University of St. Andrews. Pp. xii. 635. Illustrations, 127. London: J. & A. Churchill. 10s. 6d.

Professor's Marshall's book has been written solely with a view to the requirements of medical students and chemists, who intend presenting themselves for the final examination (section E.) for the Associateship of the Institute of Chemistry. After three introductory chapters treating of vegetable and animal products, pharmacopœial preparations, and pharmacopœial standards, the rest of the book is devoted to a systematic consideration of the individual drugs, which are divided into "inorganic substances," "synthetic organic substances," and "animal and vegetable substances." The treatment of the inorganic substances is founded chiefly on the ionic hypothesis of solution. Whatever advantages this may have from the chemical and electrical standpoints, it is certain that it should conduce to clearness of thought concerning the pharmacological action of salts. The section of "synthetic organic substances" is the least satisfactory so far as classification is concerned, because it includes such substances as the paraffins, alcohol, sweet spirit of nitre, glycerin, milk, sugar, and similar bodies: substances which cannot be regarded in any true sense as being synthetically prepared. Professor Marshall has adopted what some may consider to be not only a novel, but a fanciful, classification of vegetable and animal substances. It is, we think, an honest attempt to find a scientific basis for the study of materia medica, and consists in grouping drugs in accordance with the chemical character of their active principles. The drugs, whose main active constituents are alkaloidal, are placed together, then those containing glucosides, then, in succession, those containing principles which are derivatives of anthracene, tannins, neutral principles, volatile oils, resins and allied substances, tarry products, etc. The practitioner and the student, who desire to be abreast of the latest researches concerning the chemistry and pharmacology of the official materia medica, will find all they need in a most succinct form. The constitutional formulæ, which are introduced to exhibit the relationships of the newer remedies, will assist the student to appreciate the chemical foundation upon which the practice of medicine rests. Of the numerous illustrations produced by photography, we can speak with unqualified praise; with scarcely an exception they illuminate the text, which is itself self-illuminating by reason of the well-displayed variations in the type. In the next edition we think that the arrangement of drugs might be so altered as not to make it necessary to place tartaric, citric and oleic acids among the inorganic substances, and honey would find itself quite at home among the sugars rather than with unclassified animal products. A statement concerning the four official laxative fruits is rather curious. It is to the effect that their laxative action is aided by the mechanical action of their seeds. How this can be, we do

not understand, seeing that the seeds of figs are rejected in making the confection of senna, and that no one thinks of ingesting the seeds of prunes, tamarinds, and cassia. These trivial blemishes are worth mentioning only as an indication of the high standard which Professor Marshall has reached in this text-book, which is, we think, the expression, in some measure, of his idea of the manner in which pharmacology should be taught. The book is published in the excellent style for which the publishers are so justly celebrated.

Handbook of Physiology for Students and Practitioners of Medicine. By Austin Flint, M.D., LL.D., Professor of Physiology in the Cornell University Medical College; Consulting Physician to the Bellevue Hospital, etc., etc. Pp. 877. London: Macmillan & Co., Ltd. 21s. net.

Since 1858, Professor Austin Flint has been actively engaged in teaching physiology to medical students, and during this time he has published various works upon physiology, including a text book of human physiology in 1875. During the succeeding twenty-five years many editions of this book were published, and the present work before us has been compiled upon the experience of its predecessors. It represents, so far as is possible, the instruction in physiology now given at the Cornell University Medical College by Professor Flint. The subject has been treated from a medical standpoint; at the same time, general experimental physiology and biology have not been neglected. Descriptions of laboratory exercises, illustrations of instruments and apparatus, descriptions of the electrical phenomena in muscle and nerve, mathematical formulæ and calculations involved in physiological optics and acoustics, have been omitted, and in this we think the author has been wise. It is of great assistance to the student of physiology to have at hand such a book as that by so experienced a teacher as Professor Flint. At the end of the volume is an atlas consisting of 16 beautifully coloured plates, representing 48 illustrations, of which many are in three colours, and all are clear and constitute a valuable addition to the book.

Laboratory Manual of Physiology. By Frederick C. Busch, B.S., M.D., Professor of Physiology, Medical Department, University of Buffalo. Pp. 195. London: Bailliere, Tindall & Cox.

This little volume gives a general outline of experimental physiology for the use of senior students of medicine. All the more important nerve-muscle experiments are described, and this description is followed by exercises in connection with blood, including globulicidal action of serum. There is a good account of the Riva-Rocci sphygmomanometer for determining the blood pressure in man. Then follow experiments in connection with digestion, absorption, internal secretions, and respiration. The concluding chapters are upon excretion, sensation, and vision. The book, however, is not one which can be used by English students as a laboratory guide, for many experiments are described which include vivisection, and some of these we think are quite unnecessary, while those which are necessary should only be undertaken by an experienced teacher. There are but few illustrations, which, for the most part, are very well executed.

The Urethrotomies and Kidney Capsulotomy. By Reginald Harrison, F.R.C.S., Consulting Surgeon to St. Peter's Hospital, etc. Pp. 96. London: John Bale, Sons & Danielsson, Ltd. 2s. 6d.

This little book comprises a series of clinical lectures delivered at the London Medical Graduates' College and Polyclinic. In it internal urethrotomy and external urethrotomy are discussed, and the application of the latter operation to various conditions is dealt with in several chapters. A chapter is also devoted to kidney capsulotomy, or incision of the renal capsule in cases of subacute nephritis. There is much that is reminiscent of Mr. Harrison's own work in these pages, and he tells the story of the methods of incision of the urethra in an interesting and instructive manner. There are many practical hints from the author's abundant store of experience which add greatly to the value of the book. In the chapter relating to Kidney Capsulotomy, the history and objects of this operation, which Mr. Harrison introduced, are fully discussed. These lectures should form attractive reading to a wider circle than that to which they were primarily addressed.

The Hunterian Lectures on Gastric Surgery. By Herbert J. Paterson, M.A., M.B., B.C. (Cantab.), F.R.C.S. (Eng.), Hunterian Professor of Surgery and Pathology at the Royal College of Surgeons, and Assistant Surgeon to the London Temperance Hospital. Pp. viii + 180. 5 illustrations and 2 plates. Demy 8vo. London: Baillière, Tindall & Cox. 6s. net.

In these lectures the author deals first with the operations of gastro-jejeunostomy, and then proceeds to the consideration of gastric ulcer, its complications and treatment. Infantile hypertrophic stenosis and gastric cancer next receive attention. An appendix on technique and after-treatment, together with a short bibliography, and a large number of statistical tables, completes this little book. The operation favoured is the anterior gastro-jejeunostomy; and the author lays great stress on the necessity for a large opening, excision of mucosa, and for the use of anchor sutures. Mechanical appliances are entirely discarded, and union is effected by two continuous sutures. The book is extremely interesting and readable.

An Essay on the Treatment and Cure of Pulmonary Consumption. By George Bodington, of Sutton Coldfield, A.D. 1840. Reprinted with a Preface by Dr. Arthur E. Bodington. Lichfield: Lomax's Successors. London: Simpkin, Marshall, Hamilton, Kent & Co.

In his preface to the reprint of his grandfather's essay, Dr. Bodington claims with justice that the modern treatment of pulmonary consumption is not a recent discovery, but was advocated and carried into practice so long ago as 1883. It is not a little painful to learn that when this essay was first published, it was met with opposition and ridicule, but it is satisfactory to find that, when its author died in 1882, in his eighty-third year, tardy justice was done to his memory and to his enlightened views.

We have read the essay with considerable interest and, although some points are naturally a little antiquated, the drift of the whole is marvellously up to date. Take, for instance, the following: "I come now to the most important remedial agent in the cure of consumption, that of the

free use of a pure atmosphere; not the impure air of a close room, or even that of the house generally, but the air out of doors, early in the morning"; and again, "The abode of the patient should be in an airy house in the country; if on an eminence, the better: the neighbourhood chosen should be dry and high, the soil generally of a light loam, a sandy or gravelly bottom, the atmosphere free from fog and dampness. The patient ought never to be deterred by the state of the weather from exercise in the open air." Dr. Bodington's recommendation that consumptive patients should be placed in country houses, in proper situations, well ventilated and provided with all "appliances and means to boot" under the care of specially qualified practitioners sounds very much like the suggestion for the establishment of the modern sanatorium. Dr. Arthur Bodington is to be commended for thus striving to do full justice to his grandfather's wisdom and foresight.

Biographic Clinics. Vol. III.: Essays concerning the Influence of Visual Function, Pathologic and Physiologic, upon the Health of Patients. By GEORGE M. GOULD, M.D., editor of *American Medicine*, etc. London: Rebman, Limited. 5s. net.

THIS volume, as its description implies, is a collection of essays, for the most part reprinted from *American Medicine*, of which Dr. Gould is the editor, and other American medical journals, and notably two papers by distinguished English ophthalmologists. One of these is by Mr. Simeon Snell, F.R.C.S., Professor of Ophthalmology, University College, Sheffield, on "Eyestrain as a Cause of Headache and other Neuroses," the other by Mr. C. Ernest Pronger, F.R.C.S., Ophthalmic Surgeon to the Harrogate Infirmary, on "Slight Errors of Refraction and their Influence on the Nervous System." The tendency of these essays is to show that defective eyesight may be at the bottom of headaches, gastric troubles, numerous forms of reflex neurosis, cardiac palpitation, or irregularity, chorea, epilepsy, renal diseases, constipation, etc., etc., and, in children, nocturnal enuresis. In short, that these and other diseases may be cured by the use of properly adjusted glasses! "In neurology," we are told, "there is no limit to what the refractionist may justly claim."

One of the chapters reprinted from the *Annals of Opthalmology*, is on the "Reception of Medical Discoveries," and very rightly draws attention to the unkind treatment to which earnest students in medicine and surgery have been subjected by members of the profession whose preconceived notions have been seriously assailed by the discoveries of their more industrious colleagues. We should be sorry to say anything unkind of Dr. Gould, still less of his English colleagues, for both Mr. Snell and Mr. Pronger have been studiously modest and careful in the way in which they have dealt with their subjects. That greater attention should be paid to defects of eyesight must be admitted on all sides, and we would express entire agreement in the suggestion that, in all cases, the opinion of specially qualified ophthalmologists should be obtained, but we cannot admit that all the wisdom on such matters has been confided to the other side of the Atlantic. We cannot admit that "The Continent of Europe still lingers in pitiful barbarism upon this subject," nor that only now "in England the light is breaking." As a proof that it has for long

past engaged the attention of specialists in this country, we need only call attention to two articles in THE PRACTITIONER for July last by such experts as Dr. Campbell Thompson and Mr. Walter Jessop, whose work in this direction has been well known and appreciated for many years past.

Anatomy and Physiology for Nurses. By LEROY LEWIS, M.D., Surgeon to and Lecturer on Anatomy and Physiology for Nurses at the Lewis Hospital, Bay City, Michigan. London: W. B. Saunders & Co.

THIS is quite the best book on anatomy and physiology for nurses that we have yet come across. It is written for American nurses, whose technical instruction is on a more advanced scale than that given to their English sisters, and is most comprehensive. As a rule, such books are sketchy, and, in order to gain further knowledge, nurses are obliged to have recourse to larger text-books, sifting the facts they want from the many points specially designed for medical students. In Mr. Lewis's book, we have a simple comprehensive work, in which all details of information are fully and clearly dealt with under their separate classifications. By referring to the headings of the chapters, or to the index, an account of any bone, vein, muscle, gland, &c. may be readily found with the history of its structure, component parts, relation to other organs, &c., &c., while the illustrations, which form quite a feature of the book, are most instructive and abundant. After reading a chapter, the student can test her knowledge by answering the questions given at its close. This will not only impress the subject on her mind, but will do much to avoid the paralysing effect of an examination paper. To those who lecture to nurses this book will prove of very great value.

The Relations of Diseases of the Skin to Internal Disorders. By L. DUNCAN BULKLEY. Pp. 175. London: Rebman. Price 6s. 6d.

There is little doubt that in modern dermatology the tendency is to return to the older ideas, with regard to the influence of internal disorders in the production of skin diseases, and, while admitting the importance of the local factors, to search beyond these for the state of health which makes them efficient causes of eruptions.

This little book is intended to call special attention to the forms of eruption, which are associated with the various morbid states, and a very exhaustive list of deviations from health is given. The perusal of the volume does not, however, seem to lead one much further into the light, not on account of any fault in the writing, but simply because the facts required are not at our command. There appears to be a tendency to exaggerate the importance of slight deviations from the average, and to describe them as definite morbid conditions. Thus the results of the urinary analyses do not appear to be striking, although the author attaches much weight to them. It is noteworthy that salt content is less carefully dealt with than is the case with urea and uric acid.

Notes by the Way.

An Extra Number of "The Practitioner."

It is with considerable satisfaction that we have been able to publish, for the benefit of the medical profession generally, an extra number of THE PRACTITIONER dealing with the use of X-rays in the diagnosis and treatment of the various forms of accident, injury, and disease. So far as we know, no text-book dealing with the subject in anything like so comprehensive a form has been published, and we therefore confidently express the hope that this extra number will be found to afford not only information of the utmost value to the general practitioner, but also guidance of the most useful and practical nature in the use of X-rays. Seeing that hitherto the literature on the subject has been neither comprehensive nor authoritative, the articles which have been selected for the benefit of our readers, coming as they do from authorities whose practical experience must command attention and respect, cannot fail to excite general interest.

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The Importance of X-Rays in Diagnosis.

THE importance of diagnosis in such cases as those to which reference is made in the book is to a certain extent of recent birth, and perhaps on that account will be regarded by many, at least, of our older colleagues with a certain amount of reserve and caution; but when they realise that a far greater amount of accuracy in the determination of the nature of the case is rendered possible, and that consequently a very much higher degree of confidence in dealing with it is afforded, we feel sure that they will at once recognise the indispensable character of the invaluable aid now afforded by means of the use of the X-rays. We find that by the use of these rays we are no longer dependent on the signs which may, or may not, be clearly indicative of all the details of the case, nor on the symptoms, which, after all, may be altogether misleading, but that, on the contrary, all the facts, as in a picture, are indisputably set before us. We confidently commend this very important extra number of THE PRACTITIONER on "X-Rays in Diagnosis" to the favourable consideration of the whole medical profession. Details will be found in our advertisement sheets. The first

edition has been completely exhausted, but a large second edition is now ready.

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The Alcohol Question.

WHATEVER else can be said of alcohol, there can be no question that it is a most potent stimulant, for it excites those who abstain from it even more than those who drink it. It is scarcely possible to exaggerate the dangers of its abuse, but when the condemnation is extended to the use of it in any form and in any dosage, sensible men simply shrug their shoulders at the absurdity of the thing. What are a few laboratory experiments to the lifelong experience of the majority of mankind? Can the fact that a German professor loses something of his intellectual grasp after taking alcohol—probably with the determination to find that it has such an effect—be allowed to weigh against the testimony of Gladstone that he found wine a most valuable help to the successful performance of a great oratorical effort? Again, what importance is to be attached to the testimony of men who have been abstainers all their lives, having been frightened in the nursery by the bogey alcohol, as other children are by ghosts and devils? It is a truism that alcohol is a poison; but so are coffee, tea, and tobacco. The abuse of all these things is highly injurious. How are their harmful effects prevented? Exactly in the same way as those of strychnine, which appears to be suggested as a substitute for alcohol—by strict moderation in dosage. Milk, which is said to be displacing alcohol in hospitals, may be the deadliest of poisons, and even when it is free from infective material, there are many whose digestive apparatus cannot deal with it satisfactorily.

* * * * *

The Therapeutic Value of Alcohol.

THE dogma has recently been promulgated that the therapeutic value of alcohol is nil. This is surely a striking example of the power of a preconceived idea to blind the sharpest sight to facts which to unscaled eyes are open and palpable. Every person of unbiassed mind who has worked in a hospital has seen cases of pneumonia, typhoid fever, and heart disease snatched from the very jaws of death by the administration

of alcohol at the critical moment. Of these occurrences he could say with Orgon :—

> Je l'ai vu, dis je, vu, de mes propres yeux vu
> Ce qu'on appelle vu.

The fanatic would, of course, retort with Madame Pernelle :—

> Mon Dieu ! le plus souvent l'apparence déçoit.
> Il ne faut pas toujours juger sur ce qu'on voit.

It is admitted by all that Anthony Todd Thomson and his followers went beyond all bounds in the therapeutic abuse of alcohol ; now we, in accordance with the law which regulates the swing of the pendulum of medical opinion, are going too far in the opposite direction.

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The Position of the Profession.

THE fact is the profession is in danger of drifting into a false position on the alcohol question. Few men in any profession have the habit or power of thinking for themselves, and medicine is no exception to this rule. We are led astray by the glamour of great names and by fashions of thought. It is not a pleasant thing to say, but we believe it to be the truth, that there is a certain amount of insincerity in the outcry against alcohol that is now heard from so many quarters. The agitation is led by a few men whose intensity of conviction would probably lead them to go to the stake rather than give a drop of alcohol to a dying man ; the bulk of their followers would stop considerably on this side of martyrdom. One famous physician, who in his day was an ardent apostle of total abstinence, made no scruple of reviving his flagging energies with champagne when necessary—and it often was necessary. Men will tell the public from the platform that alcohol must, if given at all, be administered on a scale of dosage as strict as that applicable to the most powerful poisons ; and, like too many preachers, will scoff at the notion of practising their own precepts.

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Temperance Teaching in Schools.

THE knowledge of such facts tends to lessen the edification we might otherwise derive from the spectacle of the profession presenting a petition to the Government, asking that the teaching of temperance should be made compulsory

in elementary schools. It may be remembered how virulently Sir Michael Foster was abused in certain quarters for his memorandum to the Education Board in which the alcohol question was dealt with in a reasonable manner. What good cause there was to deprecate exaggeration and downright falsehood in temperance teaching is shown by some facts published in a letter addressed to the *Times* by an anonymous correspondent, who is clearly well informed. "Scientific temperance education" was made compulsory in the public schools of the United States some years ago. Not long ago a sub-committee of the "Committee of Fifty to Investigate the Liquor Problem" was appointed to examine into the working of the system. In their report they state that, "as is generally the case when feeling and prejudice run high, the temptation has been irresistible to either manufacture evidence, or stretch it over points that it does not cover, to call 'scientific' everything that happens to agree with particular prejudices and to relegate to the limbo of human error everything that appears for the other side." Nevertheless, nearly all the States of the American Union enacted laws making "scientific temperance education" compulsory. School books on the subject were issued under the auspices of the pioneers of the movement, and adopted in schools all over the country. The sub-committee expressed strong disapproval of the teaching conveyed in these books. The writer quotes the following statements and specimens :—

"Alcohol sometimes causes the coats of the blood vessels to grow thin. They are then liable at any time to cause death by bursting."

"Worse than all, when alcohol is constantly used it may slowly change the muscles of the heart into fat. Such a heart cannot be so strong as if it were all muscle. It is sometimes so soft that a finger could easily be pushed through its walls. You can think what would happen if it is made to work a little harder than usual. It is liable to stretch and stop beating, and this would cause sudden death."

"Many people are made crazy by the use of alcoholic liquors. In some asylums where these people are kept it has been found that nearly one-half of the crazy people were made crazy from this cause. Not all of these were drinkers themselves. It often happens that the children of

those who drink have weak minds or become crazy as they grow older."

"Sometimes the stomach is so hurt by alcohol that the drinker dies."

"A noted murderer confessed that never but once did he feel any remorse. Then he was about to kill a babe, and the little creature looked up into his face and smiled. 'But,' he said, 'I drank a large glass of brandy and then I didn't care'."

The last touching story has done duty in the pointing of many morals. In our childhood, now alas! somewhat remote, we used to be thrilled by this tale with Burke as the "hero;" the babe was slain, but without the brandy, and its little corpse sold to the "doctors." The story must have been apocryphal even then, for among the many victims of Burke and Hare there is no mention of a child. Unprejudiced people will, we take it, agree with the sub-committee when they say "that the text-books are written with the deliberate purpose to frighten the children, the younger the better, so thoroughly that they will avoid all contact with alcohol, an attempt fraught with danger on account of the inevitable reaction on healthy children, boys especially, to such exaggerated statements. . . . . The books, especially those intended for the lower grades, fairly bristle with statements of a character to work upon the fears of the reader, and remind one in this respect of patent medicine advertisements."

They sum up the case by stating that the "scientific temperance instruction" given in the schools is "neither scientific nor temperate nor instructive." Are recent utterances of authorities generally accepted as exponents of the highest science calculated to inspire any confidence that the teaching in our own schools would be of a different character?

* * * * *

"Wine that Makes Glad the Heart of Man."

THE fact is that the advocates of temperance take the worst evils produced by the habitual and prolonged abuse of vile concoctions containing alcohol in its most poisonous forms, and try to suggest that these are the natural and inevitable effects of drinking sound alcoholic beverages

in strict moderation. This kind of argument is a familiar weapon in political and theological controversy, but science should not stoop to use it, and in its hands it can only help to defeat the cause it is meant to advance. When the children find out, as they must do in time, that they have been taught what is not true, they will discard the good part of the teaching with the bad. Even if it were true that the therapeutic value of alcohol is nil, the fact would remain that, when properly used, it has a value in "making glad the heart of man," and thereby promoting kindly feelings. Sir James Paget used to thank God for good wine as well as for good food.

A few years ago nearly all the scientific authorities of France expressed the opinion that pure wine, taken in moderation, is not only not injurious, but positively beneficial. The same may be said, within stricter limitations, of good whisky or brandy. There are, of course, idiosyncrasies in this as in other things. What is moderation in one is excess in another; there is no uniform standard. A man who, like Cassio, has very poor and unhappy brains for drinking, should avoid alcohol as a deadly poison. But the world rightly turns an indifferent ear to such a one utterly proscribing the use of alcohol, as it would to a eunuch preaching a rule of universal chastity.

* * * * *

The Dangers of the Strenuous Life.

SINCE Mr. Roosevelt preached the gospel of the strenuous life, a good deal has been heard about it, and his own life of ceaseless effort has been held up as an example to all men. Now it is beginning to be whispered that the President is finding the strain of the strenuous life tell upon him. It is good to be strenuous, but it is also good, as the poet tells us, to play the fool, or at any rate to be idle, at the right time and in the right way. This is just what the strenuous man forgets, and the consequence is too often premature breakdown. This is a common event in the storm and stress of modern life. The strenuous life is helping to overcrowd our asylums. Things are worse in America, where nervous breakdown has come to rank as a national disease. Arteriosclerosis, which is largely due to over-tension of arteries caused by nervous strain, is said to be on the increase. Heart disease

claims more victims than was formerly the case. But perhaps the worst effect of the strenuous life is the lessened resistance to morbid influences of various kinds which it produces. "As a consequence," says Dr. S. T. Rucker, writing in the *Journal of the American Medical Association*, "we fall easily victims to almost any disease, such as pneumonia, tuberculosis, typhoid fever, cancer, and grave kidney lesions. If a man, who lives this kind of life, undergoes a surgical operation of any consequence it is exceedingly hard for him to recover. His vitality is so lessened than any traumatic lesion will probably undergo necrosis or gangrene instead of healing." To this list we would add diabetes, which stands in close relation to nerve strain.

* * * * *

Strenuousness in Sport.

It is not only in work that we are too strenuous. Our play is apt to become severe work owing to the earnestness with which the mimic contest is carried on, and the eagerness with which victory is sought for as an end in itself. We do not speak here of the dangers of excessive athleticism, for they are universally recognised. Sunday, which should be a day of rest for the body as well as for the mind, is often spent in fatiguing efforts to achieve some feat, and failure brings in its train ill-temper and depression out of all proportion to the exciting cause. We need to learn the incalculable value of rest. This consists, not in a change of excitement or in hard work disguised as a game, but in that genuine repose of which Charles James Fox, strenuous as he was in politics and in play, was thinking when he said there was nothing so pleasant as to lie under a shady tree with a book as to do so without a book. A man who knows how to rest from labour will live longer and accomplish more than one who allows the fever of "strenuous" living to fret his mind and body to premature decay.

* * * * *

Mummies and Microbes.

Dr. Raphael Sorgnac, a French bacteriological planet, who had not previously swum into our ken, has propounded a novel theory to account for the wide prevalence of tuberculosis at the present day. Briefly, he holds that the spread of tuber-

culosis throughout Europe and America, during the past hundred years, had its origin in the exhumation and distribution throughout the world of the mummies which had lain for thousands of years in the tombs of ancient Egypt. He says that the tubercle bacilli may live for enormous periods of time in the dust of mummy cases, and that the disturbance of these mouldering relics of humanity has been avenged by the transmission of infection to the scholars and workmen who violated their resting places. Even the keepers of the mummy cases have not escaped. According to Dr. Sorgnac, the beginning of any serious prevalence of tuberculosis in France can be traced to the large importation of mummies at the time of Napoleon's invasion of Egypt. This gave the fell disease a foothold in Europe, whence it has spread all over both hemispheres. Dr. Sorgnac states that it has been shown by experiments in Paris that the old Egyptian bacilli are infinitely more virulent than those obtained from living consumptives. These statements, as Mark Twain says of those in the *Pilgrim's Progress*, are interesting but tough. How, when, and by whom has it been proved that bacilli can live for thousands of years in mummies or in anything else? It is difficult to see how such a proposition could by any possibility be proved. One would like, too, to know something about the experiments in Paris by which the extreme deadliness of these antique bacilli has been demonstrated. We are inclined to think that Dr. Sorgnac, or the enterprising American journalist who has presented his views to the world, is indulging, like the German Master in *Vice Versâ*, in "a most imbortant choke." We are rather confirmed in this opinion by the fact that other writers have suggested that tuberculosis was the Great Plague of the Pharoah of the Exodus, and that the riflers of Egyptian tombs are being appropriately punished for their sacrilegious deeds. But in some quarters the theory appears to be taken quite seriously. Dr. Clifton H. Levy, of New York, commenting on it, points out that it is generally admitted by scientists that among bacteria are some species that are able to live without free oxygen, without light, and at a relatively high temperature, and this to an extent known among no other group of living beings. He goes on to say:

"It must not be forgotten that the science of bacteriology is a brand-new science, so new, in fact that we have not had the time as yet to test thoroughly the length of time that a dried bacterium may remain in a suspended state of animation. We do know that some of these when dried will survive a period of ten years and then return to activity. It is the preservation for the first year or two that is difficult or rather astonishing.

"But if a germ survive ten years there is no reason to believe that this germ would not remain in the same condition for ten centuries or twenty or thirty centuries under proper conditions.

"These conditions exist to a nicety in the tombs of Egypt. The bodies had been wrapped in moist cloths first, and then, after continued wrapping, deposited in stone sarcophagi or coffins and placed in tombs, which were hermetically sealed for ages. The temperature was an even, constant one, and it has been proved in connection with all organic matter that the dry soil of Egypt is a wonderful preservative. Manuscripts, for instance, that would have fallen to pieces when buried in any other soil have been perfectly preserved, and it is little wonder, then, if the dried germs of diseases have also been kept in this manner, especially under the very favourable conditions of mummy-making and burial."

Even if it be admitted, however, than the span of microbic life is indefinitely extended under favourable conditions, Dr. Sorgnac's main thesis, like Mahomet's coffin, remains hanging in the air, without support.

* * * * *

Competitions.

THE result of the competition for August is as follows:—The best essay was sent in by Dr. H. W. Moxon, of Matlock; and the best answers to the questions by Dr. E. N. Nason, of Nuneaton. Cheques have accordingly been sent to these gentlemen.

Practical Notes.

THE CONJUNCTIVA.—The conjunctiva, as is well known, lines the back of the upper and lower eyelids, where it is known as the *tunica conjunctiva palpebrarum*, and is continued over the front of the eyeball, where it is called the *tunica conjunctiva bulbi*. The region, at which it is reflected on to the globe of the eye, is known as the *fornix conjunctivæ*. The upper fornix is much deeper than the lower one. The palpebral portion of the conjunctiva adheres intimately to the tarsal plate, and has on it many small papillæ. It is covered by a fine layer of stratified epithelial cells, and, in the region of the fornix, there are many tubulo-acinar glands which open on to its free surface. These are more abundant on the upper than on the lower eyelid. The conjunctiva, which covers the globe, is thinner and more delicate than that lining the eyelids, and is very loosely attached to the sclera by submucous tissue. This attachment in old people is often extremely lax, so that the conjunctiva often appears to be thrown into loose folds on the eyeball. Over the cornea, the stratified epithelium of the conjunctiva is intimately attached to the anterior homogeneous layer of Bowman, and upon it the columnar epithelial cells of its deepest layer rest. Immediately beneath this stratified epithelium is the subepithelial plexus of non-medullated nerves, and there arises from it a terminal plexus of fine fibrils, which pass out in tufts and become lost between the epithelial cells. M. S. Mayou states that, at the tenth week of fœtal life, the margins of the upper and lower eyelids come into contact with each other, and that there is then a proliferation of the epithelial cells between the two adjacent surfaces out of all proportion to that which takes place in the skin, or on the conjunctival surface. The lids now become firmly united together, and, at the same time, tightly stretched over the globe, and this seems to materially assist in their proper development, since, in severe degrees of microphthalmos the eyelids are short and the conjunctival sac ill developed. The conjunctiva, at this time, is a closed sac, lined by a single

layer of epithelial cells, which are epiblastic in origin, and, although the surface epiblast at this period begins to thicken, that lining the conjunctival sac remains as a single layer until the eyelids have separated.

Bacterial Conjunctivitis.—The method of microscopically examining a discharge from the conjunctival sac is simple. A little of the pus, or mucopus is taken with a fine platinum loop, and films prepared in the usual way. One film may be stained with Löffler's blue, or carbol thionin, and the other by Gram's method, followed by a little dilute carbol fuchsin. The most common causes of bacterial conjunctivitis are the Koch-Weeks bacillus, the bacillus of Morax and Axenfeld, the gonococcus of Neisser, and the pneumococcus of Fraenkel. In rarer cases of conjunctivitis, the streptococcus, the staphylococcus, the pneumo-bacillus of Friedländer, and the bacillus diphtheriæ, may be found. Of these forms of conjunctivitis, those due to the Morax-Axenfeld and the Koch-Weeks bacilli, are most usually met with.

The Morax-Axenfeld bacillus is large and broad, the sides are parallel, and the angles somewhat rounded, two bacilli are frequently seen with their ends somewhat approximated. It is usually *extra cellular*, but occasionally bacilli may be seen within the cells. The bacilli are decolourised by Gram's method of staining. The bacillus produces a non-purulent form of conjunctivitis, the discharge being a soapy kind of secretion, which is found along the margins of the eyelids, and at both the angles of the eye, although it accumulates more in the region of the caruncle. The secretion consists chiefly of epithelial débris, bacilli, material produced by the Meibomian glands, and a few scattered polymorphonuclear cells.

Mucopurulent Conjunctivitis.—This form of conjunctivitis is caused, as a rule, by infection with the Koch-Weeks bacillus. It is very minute and thin, and closely resembles the influenza bacillus. It is frequently intracellular, and although the cells containing it are difficult to find, yet, when they are discovered, each one is seen to contain large numbers of bacilli. The organisms are most readily demonstrated by using Carbol thionin, or Löffler's blue stain: they are decolourised by Gram's method of staining. The disease occurs most frequently in children, both eyes being, as a rule, involved, and is extremely

contagious, for one child may infect a whole school; adults, as a rule, acquire the disease from children. The ocular conjunctiva becomes injected, and there are often numerous hæmorrhages over the surface. There is, as a rule, little involvment of the submucuous tissue, hence the absence of chemosis. The patient complains that the eyes feel gritty; the lids are stiff, and, during sleep, stick together. The discharge is at first serous, then mucopurulent, and is generally profuse, in the worst cases the lids become red and œdematous.

The treatment should first consist of warning the parent, or guardians, of the importance of keeping the child away from other children on account of the contagious nature of the disease, and, at the same time, of insisting that all towels, cloths, sponges, etc., used by the patient should be kept exclusively for that individual, and afterwards boiled, or, if inexpensive, they should be burned. Secondly, local treatment must be applied to the eye, from which the discharge should be carefully washed away four or five times a day. This may be readily done by soaking a pledget of absorbent cotton wool in an appropriate solution, and then gently and slowly squeezing it so as to get a continuous gentle stream, which should be allowed to drip into the inner canthus of the eye. During this proceeding, it is advisable that the patient should lie down, and that each eye should be held gently open by the index finger and thumb of the individual who is bathing it. Any of the following lotions will be found to be useful for the purpose:—

℞ Hydrargyri Perchloridi - - - gr. $\frac{1}{16}$.
Aq. Dest. - - - - ℥i.
Ft. Collyrium.

℞ Acidi Borici - - - - gr. x.
Zinci Sulphatis - - - - gr. ij.
Aq. Dest. - - - - ad ℥i.
Ft. Collyrium.

℞ Sodii Biboratis - - - gr. vj.
Acidi Salicylici - - - - gr. ij.
Aq. Dest. - - - - ad. ℥i.
Ft. Collyrium.

In many cases, a weak solution of silver nitrate is extremely useful, which should not be used, however, stronger than two grains to the ounce of distilled water. Before the

patient goes to sleep at night, a little spermaceti ointment should be painted along the margins of the lids with a clean camel's hair brush, after all the discharge has been bathed away. This procedure prevents the lids from sticking together during sleep. In no circumstances should the eyes be bandaged up, for every facility should be allowed for the discharge to escape. As a rule, no corneal complications arise, but the condition is not infrequently associated with the presence of one or more phlyctenulæ, which usually occur at the corneoscleral margin.

Pyorrhœa Alveolaris.—This affection, which is frequently known as Rigg's Disease, consists of inflammation of the margins of the gums, associated with a discharge of pus, or mucopus, which comes from the tooth alveoli. In some cases, the discharge comes up from alongside the roots of the teeth. The process is preceded by an excessive deposit of tartar upon the exposed and non-exposed portions of the teeth, beneath this, bacterial infection occurs; the inflammation then spreads along the peri-odontal membrane so that pus may be squeezed up by pressing upon the gums. As a result of this inflammation of the gums (gingivitis) the gum tissue may shrink, and the alveolar border of the jaw becomes atrophied. As a result of this, the roots of the teeth become exposed, and the teeth become loosened and finally drop out. The breath of the patient is foul, and, as a result of swallowing and absorbing so much septic material, chronic dyspepsia, as a rule, follows, and later the patient is very likely to suffer from chronic gastric ulcers, or appendicitis. As a result too of toxic materials having been absorbed, the patient is liable to attacks of neuritis, and various types of anæmia, but more particularly the primary pernicious anæmia.

The treatment should consist of having the teeth thoroughly freed from all tartar, and the gums gently manipulated, so as to squeeze out all pus from them, and from the various pouches and pockets around. Astringents and antiseptics should be applied, one of the best of which is peroxide of hydrogen, which should be applied to the exposed mucous membrane, and to the various pockets and pouches in which the pus has collected. Some surgeons advocate the local application

of tannin and eucalyptus oil once or twice daily. The successful result of this treatment is that the teeth may be saved, and that the patient's general health will slowly improve, because septic intoxication is now prevented. In the worst cases, however, it is necessary to remove the affected teeth. From what has been noted here with regard to this disease, it will be readily understood how important it is to make patients understand the necessity of daily brushing the teeth, and of keeping the whole buccal cavity as clean as possible. If there is no tartar about the teeth, there can be no pyorrhœa alveolaris, and, after all, many diseases, some of previously obscure origin, have more recently been traced to oral sepsis. The following mouth-wash may be used with advantage:—

℞. Potassii Chloratis - - - - ʒij.
Glycerini Boracis - - - ʒv.
Aq. Rosæ - - - - - ad ℥x.
Ft. Lotio.

If the patient has spongy gums, which are liable to bleed readily, Whitla recommends the following mouth-wash:—

℞. Tinct. Myrrhæ - - - - - ℥ss.
Tinct. Krameriæ - - - ℥ss.
Tinct. Cinchonæ - - - - ℥ss.
Tinct. Catechu - - - ℥ss.
Eau de Cologne - - - - ʒi.
M. A large teaspoonful in a wineglass of water, to be used as a mouth-wash frequently.

Burney Yeo recommends the following as an antiseptic and soothing mouth-wash for adults:—

℞. Potassii Chloratis - - - - gr. lxxx.
Extracti Opii Liquidi - - ʒii.
Aquæ Laurocerasi - - - - ʒi.
Decoct. Hordei - - ad ℥viij.
M. Ft. Lotio.

Or the following:—

℞. Acidi Salicylici - - - - - gr. xxxij.
Spiriti Vini Rectif. - - - ʒiij.
Aq. Camphoræ - - - ad ℥viij.
M. Ft. Lotio.
(Dissolve the acid in the spirit and then add the water.)

Ingrowing Toe-nail.—This condition consists of inflammation of the matrix and skin at the side of the nail, usually on the outer side of the great toe, where it comes into contact with the second toe. It occurs in adult males and females, usually of the working class, who wear badly fitting tight boots, and who have a great deal of walking to do, and who, at the same time, do not keep their feet clean. It is occasionally found, too, that the great toe-nail has been cut too short so that none projects beyond the soft parts. The soft parts of the toe become pressed up against the side of the nail, and ulceration occurs along the lateral fissure. In some cases, there is an offensive discharge from the ulcer, and much swelling takes place in the lateral fold of skin. The chief symptoms are that the patient has pain on walking, and, in bad cases, walking may be impeded. If the disease is not attended to early, lymphangitis may occur. The treatment consists in attending to the hygiene of the foot, which should be kept thoroughly clean, the toe-nails cut square and their edges allowed to project slightly beyond the soft parts. The socks should be changed frequently, and the patient instructed to wear properly fitting boots and shoes. In some cases, in which the nail is thick and well developed, and there is no ulceration in the lateral fissure of the nail, it is sometimes found to be a good plan to introduce a small pad of boric acid lint underneath the nail, so as to take off the pressure of its edge; at the same time the previous points, with regard to the general hygiene of the foot, must be insisted upon. In the worst cases, however, operation is advisable, and Cheyne and Burghard recommend the following simple operation as the best:—"The patient, being under an anæsthetic, a lateral flap is cut at the side of the toe by entering the knife vertically at the base of the nail just outside the ulcerated area. The point of the knife, as it comes against the ungual phalanx, is carried round it, immediately outside the bone, and in contact with it, and, finally, the point may be protruded on the plantar surface of the toe, at the point opposite to that at which it was inserted. A lateral flap is then made, by carrying the knife straight forward and bringing it out beyond the nail. It is not always necessary to make a wound on the plantar surface. If the cut is carried well downwards in front,

the flap can generally be turned aside without making any incision on the under surface of the toe. The nail is now split down by scissors from the free edge to the base, a little to the outer side of the centre, and the portion on the affected side is pulled away by forceps. The matrix, beneath the portion thus removed, is then completely dissected away. Care must be taken to remove it right back to its extreme limit, for it must be remembered that the matrix extends backwards beneath the skin for about a quarter of an inch; if any portion is left behind, it will give rise to fresh growth of nail. When this has been done, there is a flap at the side of the toe, and a raw surface corresponding to what was previously the outer portion of the nail. The flap is then made to cover this raw surface, and is fixed in position by two or three stitches. The result of this operation is that no nail grows on the side operated upon, and, as the edge of the remaining portion of the nail is on a higher level than the skin, the soft parts cannot be pressed up against it; no recurrence can therefore take place, even if tight boots are worn, or even if the affected toe is on the top of the one next to it. The wound usually heals by first intention, and, after a fortnight, no further dressings are necessary, and the patient may be allowed to walk about. The disinfection of the toe before operation must be carried out with the minuteness required for all operations in this situation; micro-organisms are very abundant in the folds about the toes and nails."

Recent Preparations and Inventions.

RISICCOL.

Demuth's Castor Oil Powder (Siccolum Ricini).
(R. Demuth, 61, Mark Lane, London, E.C.)

This white, amorphous, tasteless powder is prepared from the purest castor oil, and contains about 50 per cent. of that somewhat nauseous drug. Being quite odourless and tasteless, and altogether free from the nauseating "repeating" of the oil itself, it can be safely prescribed for the most delicate and sensitive stomachs, thus securing all the advantages of the well-known aperient without any of its drawbacks.

The powder can be administered mixed with a little water, milk, tea, cocoa, soup, or any other suitable liquid, or it can be mixed with jam, porridge, or pudding.

The powder is manufactured by a secret process, but the other ingredient present with the oil is burnt magnesia, and the Institute of Hygiene certifies that it fulfils the standard of quality and merit required by that body.

VIROGEN.

(Messrs. Scott Morgan & Co., 59, Oxford Street, London, W.)

Virogen is a food, called by its makers "The Life Food," and the name is not an inappropriate one, as it contains casein, phosphorus, lime, and iron, all necessary factors for the nourishment of muscle, nerve, bone, and blood. It will therefore be seen that it supplies the necessary material for building up the muscular tissues, and the elements which are essential to the formation of nerve tissue. It is not only a remedy for disease, but also affords a means of renewing and invigorating the infinite number of cells, of which the blood and solid portions of the body consist. For those, whose system has been weakened by disease, mental or physical overwork, or worry, it would seem to be especially useful, and it may also be recommended as a cure for anæmia and chlorosis; it supplies the necessary proteid which is the true food of the blood, thus overcoming that tendency to a recur-

rence of the anæmia which exists, when the disease is treated by the administration of iron only.

Virogen can be taken with milk, hot or cold, also in coffee; it can also be used with butter, jam, or potted meat in the form of a sandwich, or, after being made into a thin paste, with porridge, or any other kind of farinaceous food.

Another, and an exceptionally convenient and portable form, in which it can be administered is a combination with cocoa or chocolate. In this way, it will be found an exceedingly useful and helpful companion to all travellers and professional men, whose duties are naturally trying and exhausting, and necessitate prolonged absence from home.

"TABLOID" BRAND PASTILLES.

(Messrs. Burroughs Wellcome & Co., London, Sydney, and Cape Town.)

Laxative Fruit.

Those who have vivid and unpleasant recollections of senna tea, or indeed of any other old-fashioned and by no means agreeable laxative remedies, will sincerely welcome these Laxative Fruit Pastilles, which present an efficient laxative in an agreeable form, aad which possess distinct advantages over other aperients. Each pastille contains 5 gr. (·324 grms.) of extract of senna fruit in a suitable and pleasantly flavoured basis, thus proving an attractive sweetmeat. This being so, the pastilles form an acceptable aperient, specially suited to the needs of children and ladies in a delicate state of health, when drastic purgatives are most undesirable.

Menthol and Eucalyptus.

The value of menthol and eucalyptus, in most throat and bronchial affections, has long been recognised, and preparations of these drugs, in almost every conceivable form, have been introduced into the market. Few, however, can vie with the "Tabloid" Pastilles of Messrs. Burroughs Wellcome & Co. Each of these pastilles contains $\frac{1}{20}$ gr. of menthol and $\frac{1}{2}$ min. of oil of eucalyptus, forming an excellent and pleasant means of treatment for any infective, inflammatory, ulcerated, or catarrhal conditions of the mouth and throat.

Like other similar "Tabloids," these pastilles are issued in elegant little metal boxes of two sizes.

COMPETITIONS.

We offer our readers every month two Prizes on the conditions stated below.

A Prize of Two Guineas will be given to the author of the best Essay on a subject to be announced by the Editor.

A Prize of One Guinea will be given to the author who submits the best account of three cases, medical, surgical, or obstetrical, taken from the practitioner's own note-book. The style of the account, as well as the medical interest of the cases, will be taken into consideration.

Results of the September Competitions will be announced in the November number.

The Subject of the Essay for October will be

The Relative Value and the Selection of Disinfectants.

GENERAL CONDITIONS.

A.—All MSS. relating to the Essay must be marked on the top left-hand corner "Essay," and must be sent to the Editor of The Practitioner, 149, Strand, W.C., on or before the 1st day of November 1906.

B.—All MSS. relating to the cases must be marked on the top left-hand corner "Cases," and must be sent to the Editor on or before the 1st day of November, 1906. The matter submitted must not exceed three hundred words for any one case.

C.—No Essay will be returned unless a special request is made, accompanied by a stamped addressed envelope.

A and B.—(1) One side of the paper only must be written on.

(2) The name, or pseudonym, and address of the competitor must be clearly written on each sheet of paper used.

(3) The decision of the Editor is final.

(4) Competitors must be registered General Practitioners.

(5) The attached Coupon must be filled up by each competitor.

THE PRACTITIONER.

NOVEMBER, 1906.

VALVULAR DISEASE OF THE HEART.

IV.

AORTIC OBSTRUCTION.

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AORTIC obstruction exists whenever, during systole of the ventricles, the blood meets an impediment, be it small or great, to its outflow by the aortic orifice: however clinically convenient it may be, there is no logical reason for appropriating the term exclusively to those higher degrees of obstruction that afford diagnostic evidences over and above the existence of a bruit. A trivial hardening of the valves may produce no obstruction of clinical importance, but, none the less, it is aortic obstruction, though of infinitely slight degree. The simple lesion is very rare; far more so even than pure aortic regurgitation: on the other hand, the combined lesion is common, being present in my statistics in no less than 164 out of 200 cases of aortic regurgitation. The simple lesion is commoner as a congenital anomaly, or as a consequence of an acute inflammatory lesion than as a slow degenerative sclerosis, for the rigidity of the cusps, which is so constant a feature of the latter process, almost necessarily involves regurgitation as well. Whereas the combined lesion, whatever its origin, is far more common in men than in women; in the case of the simple lesion, there is no marked difference in the incidence on the two sexes: indeed, some of the most typical cases I have seen have been in young women, as a sequel of rheumatic fever. From the nature of its causation, too, the simple lesion will, on the whole, be found earlier in life than the combined lesion, which belongs chiefly to middle and advanced age.

To obtain a clear working picture of aortic obstruction, it will be necessary, as with aortic regurgitation, to draw a

sharp distinction between cases of developmental or acute inflammatory origin, which, for want of a better name, may be termed *cardiac*, and cases that have arisen out of aortic atheroma by backward propagation to the orifice or valves, which may be termed *arterial*.

The *cardiac* type of aortic obstruction has the same forerunners as have been previously noted in discussing the inflammatory lesions of other valves: acute rheumatism outnumbers all the other acute infections combined. Cases of congenital origin, whether referable to inflammation or to developmental defect, may be conveniently consigned to this group: such, however, are seldom met, except with concomitant narrowing of other orifices, most frequently the pulmonary. Arising, for the most part, in the earlier half of life, the incidence of the cardiac type on the two sexes is not materially unequal. The *arterial* type, on the other hand, being part of a widespread circulatory sclerosis, except in those rare cases of syphilitic origin, in which the disease is confined to the root of the aorta, is essentially a disease of the later half of life, and, for the most part, of the male sex, and has for its forbears the familiar causes of vascular degeneration.

Aortic obstruction may exist without any affection of the aortic orifice: at times the narrowing occurs at a subvalvular level in the portion of the left ventricle, that lies between the interventricular septum and the large curtain of the mitral valve: this is probably due to extension of a chronic inflammatory process from the mitral valve, and is a sequel of long standing mitral obstruction: at other times, a condition of congenital narrowing may involve the whole ascending portion of the aorta, or a tumour may press upon it, and produce the complete clinical semblance of aortic obstruction.

In lesions of the orifice, either valves or fibrous ring, or both, may be affected, and in their character the lesions run closely parallel to those already described in cases of aortic regurgitation. In a *cardiac* case of recent inflammatory origin, there is the same outgrowth of vegetations; characteristically these are small beadings, close to the free border of the valves on their ventricular surface that produce an almost

negligible amount of obstruction; but, in severely infective cases, they may be large soft masses, productive of much obstruction and very liable to liberate fragments into the arterial stream. Such large vegetations may occupy the whole face of the valve, and be found on either surface; when situate on the upper surface, they produce obstruction by preventing the falling back of the aortic cusps during systole of the ventricle; they may also spread to the adjacent portions of the aorta and of the ventricle. At times the inflammatory process glues the cusps together, so as to leave a diaphragm with a small central aperture, parting the left ventricle from the aorta. When the disease is of long standing, firm nodules, fibrous and cretaceous, may be seen, vestigial remnants of former vegetations; the process will then have spread to the rest of the valves, rendering them thick and hard, with blunt edges, and causing a high degree of obstruction. The aortic ring, too, is commonly involved, and, like the valves, is indurated and thickened, and often constricted as well. It is in the condition of the aorta that we find a marked contrast to cardiac cases of aortic regurgitation; commonly the lesion will be found limited to the orifice itself, and there is little or none of the secondary atheroma of the aorta, and no pouching of its wall, for the aortic obstruction holds off the strain.

The morbid lesions of the *arteria. type* may, as a rule, be readily distinguished from those of the *cardiac* type. Sclerotic changes are found in the peripheral arteries leading up to the extensive atheromatous changes of the aorta. The aorta is thickened, and its inner surface rugged with yellowish grey atheromatous plaques, which may be calcified, and not infrequently ulcerated; the mouths of the coronary arteries seldom escape some degree of occlusion. The valves are rigid and calcareous, and commonly the changes are most marked at the site of attachment.

Of all left-sided valvular lesions, aortic obstruction is the one least likely to be associated with adherent pericardium. In the heart itself the first change is hypertrophy of the left ventricle, and, in lesser degrees of obstruction, this may be the only consecutive change, unless there is interference with the supply of blood to the coronary arteries, when

muscular degeneration, with associated dilatation, ensues. With the higher degrees of obstruction, dilatation of the left ventricle, of necessity, follows sooner or later on hypertrophy, for the narrow orifice prevents adequate systolic emptying of the ventricle, and possibly also, in some cases, interferes with circulation in the coronary arteries by the medium of diminished pressure in the aorta. With advancing dilatation of the left ventricle, even though the mitral valve remains competent, dilatation of the left auricle ensues, and pulmonary congestion, but of a less degree than is found in mitral disease.

Aortic obstruction of low degree can hardly be said to give rise to any distinctive symptoms: indeed, so long as compensation is maintained, such general evidences of circulatory disturbance as shortness of breath on exertion, cardiac oppression and palpitation may be absent. With a high degree of narrowing, symptoms will inevitably appear, and may at first take the form of inadequate filling of the systemic arteries, to which will be added later, as the heart fails, symptoms of over-filling of the veins behind the seat of obstruction. The former state finds its fullest expression in the so-called Stokes-Adams syndrome of symptoms, in which the transient cerebral anæmia induces syncopal, or epileptiform seizures; in this state a condition of persistent slowness of the pulse is punctuated with periods of total suppression. In addition to the temporary obliteration of the radial pulse, the existence of other important clinical features has been established, viz., persistence of a feeble systole of the ventricle, and the presence of visible pulsation in the jugular veins. The presumption is, therefore, that the heart beat is not strong enough to overcome arterial resistance, and produce a pulse wave in the radial artery, but spends its force backwards, driving a refluent wave through the auriculo-ventricular openings. As the ventricle regains ascendency, the normal state of the circulation is restored, and the abnormal features disappear. Vertigo is the habitual accompaniment of this morbid state, while the periodic obliteration of the arterial pulse is apt to be manifested in attacks of a syncopal, or epileptiform character: these seizures, as a rule, are of the slightest. I have myself never seen these phenomena except in the presence of aortic

obstruction, and obstruction of the *arterial* type. If high resistance in the peripheral arterioles is the prime exciting cause, it is easy to see how aortic obstruction may accentuate the condition by adding a further resistance for the ventricle to overcome.

There is, however, indisputable evidence in favour of its occurrence in young patients, the subjects of periodic phases of high arterial tension, and in whom there is no suspicion of obstruction of the aortic orifice; in such the exciting cause would seem to be an alimentary auto-toxæmia. Recent investigations into the structure and functions of the auriculo-ventricular bundle of His seem likely to throw much light on the precise evolution of this peculiar syndrome of symptoms.

Pain about the heart, and particularly anginal pain, is far less common in aortic obstruction than in aortic regurgitation. Aortic atheroma may give rise to a dull, substernal ache.

In simple aortic obstruction præcordial prominence is very rarely, if ever, found; but pulsation may be visible in the third, fourth, and fifth left intercostal spaces. The apex beat is displaced downwards and outwards, and may be visible in the sixth intercostal space; typically, it is strong and sustained. So many senile cases, however, are found, along with emphysema, that one may often fail to locate the impulse at all, let alone determine its heaving character. The contrast between the big heart and the small pulse may be remarkable. The rise of the pulse is gradual, because of the slow passage of the blood through the aortic orifice; it is also small and slow, but well filled between the beats. The low sphygmographic curve, with its oblique line of ascent, rounded summit, and gradual line of descent, is quite unmistakable. There is considerable range of variation in the tension of the pulse; in the *arterial* type, the tension will tend to be higher than in the *cardiac*, in which there is no necessary increase of resistance in the arterioles: correspondingly, in arterial cases, the arteries will commonly be felt as rigid and tortuous tubes, while, in cardiac cases, there may be no perceptible change in their walls.

In a large proportion of cases, and perhaps in all of a

high degree of obstruction, a systolic thrill is to be felt in the aortic area, usually most marked in the second right interspace, and decreasing in force as it travels in an upward direction. The intensity of the thrill varies, speaking generally, with the degree of obstruction and the strength of the heart; at times it may be propagated even into the vessels of the neck, and widely over the chest. Percussion, in the absence of emphysema, will confirm the evidence of enlargement of the left ventricle afforded by the visible displacement of the apex. The characteristic bruit is systolic, and best heard in the aortic area. As a rule, it fills the greater part of systole and almost entirely replaces the first sound at the base. It is usually harsh and rasping: sometimes it is low-pitched and sonorous, sometimes soft and blowing, and, now and again, has a musical element interpolated into it: the so-called musical character may be imparted to the murmur by the vibration of a lacerated fragment of the valve in the blood-stream, but at other times it seems only to indicate a very high degree of constriction. No cardiac murmur is so loud as that of aortic obstruction at its loudest. I myself have met one, in a young woman, clearly audible at 8 inches distance from the chest, and more than one case in which the murmur was audible to the patient. Every aortic systolic murmur is conducted, more or less, upward to the vessels at the root of the neck: loud murmurs are propagated also widely over the front of the chest, and, in rare instances, even to the back. It is remarkable how quickly even the loudest murmur wanes as one approaches the apex, owing to the dip of the left ventricle. Loudness and length of murmur indicate vigorous systole of the left ventricle. As with regurgitant murmurs, obstructive aortic murmurs are sometimes best heard to the left of the sternum, but the line of conduction marks them off clearly from systolic pulmonary murmurs. A variety of opinions has been expressed as to the character of the aortic second sound: the divergence of opinion accords with its variability. When the obstruction of the orifice is the only lesion, as in the *cardiac* type, its intensity is probably diminished, as the elasticity of the aorta is less brought into play. On the other hand, in the *arterial* type, the high resistance in

the arteries will tend towards its accentuation. Even these general statements must be made with some reserve, for it is obvious that the condition of the valves themselves must be a determining factor of great importance. So long as compensation is maintained, the first sound at the apex is prolonged and booming.

It is commonly stated that aortic obstruction is the best borne of valvular lesions, and, as a general statement, this is true: if, however, allowance were made for all the cases written down as aortic obstruction on the strength of a systolic aortic murmur only, there is little doubt that the gravity of the outlook would be materially enhanced. Again, there is a wide difference, *cæteris paribus*, in the seriousness of a case of degenerative arterial origin and one that has arisen as a sequel of acute endocarditis. The former is necessarily progressive, and, moreover, the common implication of the coronary arteries leads to degeneration of the myocardium with a tendency to angina. When due to endocarditis, there is no such necessary progress of the lesion, and, with care, much may be done to avoid accidental rekindling. In such a case, prognosis depends largely on the degree of obstruction and the perfection of compensation. When the obstruction is slight, the disturbance of circulation gives rise to no appreciable symptoms, for, in a healthy individual of well-ordered habits of life, compensatory hypertrophy of the left ventricle is put forth to satisfy the demand, and to a certain point advances *pari passu* with any increase of obstruction. The degree of hypertrophy is thus some measure of the degree of obstruction in healthy young subjects, in whom the obstruction of the aortic orifice is the sole cause of strain on the left ventricle; after middle age and in all arterial cases other complicating factors intervene. In the same way, so long as the arteries are healthy, the suddenness and size of the pulse vary inversely with the degree of obstruction. The earliest symptoms of disturbed equilibrium are dyspnœa and præcordial distress on exertion as in other cardiac cases; the less good the general health of the individual the earlier will these symptoms appear. When once compensation has failed in the face of aortic obstruction, treatment can do less than in any other valvular lesion; the ratio of resistance

to power has been irretrievably upset and cannot be re-established. Sooner or later as well, the prolonged increase of pressure in the left ventricle is bound to leave its mark on the mitral valve, so that it either yields from over-distension, or becomes actually sclerosed; though its yielding may supply a safety valve to the left ventricle, this small gain is purchased at the higher price of pulmonary back pressure. Nor can the possibility, though remote, of sudden death be left entirely out of the account: in cases, in which the coronary arteries are affected, this is easy to understand, but sudden death has been noted in cases of aortic obstruction, in which no such association is present; perhaps the obstruction itself affords some obstacle to the filling of the coronary arteries.

The diagnosis of aortic obstruction depends on the presence of a systolic murmur, in or about the second right intercostal space, which is conducted upwards into the vessels of the neck, and therewith some degree of hypertrophy of the left ventricle, varying with the degree of obstruction. If this is considerable, the murmur is usually harsh and often accompanied by a strong thrill, and the pulse is small, slow, gradual in rise, and usually hard and regular. It is unreasonable to make a distinction in kind between sclerosis of the aorta or valves without obstruction, and the higher grades of obstruction, even though the former may be clinically negligible in its effects; there cannot be sclerosis of either orifice or valves without some vestige of obstruction, so that the difference is merely one of degree. It is beyond question that simple roughening of the valves, or hardening of the orifice, often does not produce an audible murmur at all: when it does there is always some encroachment on the ostium.

The so-called anæmic murmurs may present considerable difficulty. In the first place, exactly similar murmurs occur without associated anæmia, and it would be better to term such murmurs simply "accidental," anæmia constituting one such accidental cause. When anæmia is present, it is almost invariable to find co-existent a systolic pulmonary murmur, usually a bruit de diable, and often a systolic mitral murmur as well. Such accidental murmurs at the aortic orifice are much more common than is generally recognised, particularly in women. In anæmia, if any change can be detected in the left ventricle

it partakes rather of the nature of dilatation than of hypertrophy, and the pulse is full and soft. I have never seen one of these functional aortic murmurs associated with a thrill, and they are never of the harsh character of the murmurs of true obstruction : they accompany and do not replace the first sound : they are not conducted into the vessels of the neck, and they are always intensified in recumbency.

Other causes of systolic aortic murmurs are aortitis and atheroma : apparently the roughening of the aorta is sufficient to throw the blood stream into audible eddies, in the absence of any affections of the valves or orifice, or of any dilatation of the first part of the aorta : there is nothing in the character of the murmur to distinguish it from the murmur of true obstruction. There may be a history of one or other of the familiar causes of atheroma, recent or remote : the patient will with few exceptions be past the middle of life : the peripheral arteries will be tense, or even rigid, and the aortic second sound ringing. The diagnosis may be strengthened by the existence of a persistent substernal ache, sometimes with irregular fever.

A further consequence of atheroma is dilatation of the first part of the aorta, so that a *veine fluide* produces a systolic murmur in the aortic area. The dilatation may be so slight as to escape detection by the closest physical examination, until the chest is transilluminated : higher degrees of dilatation will be readily detected by the increased area of dulness and the occasional pressure signs. The antecedents will be, of course, those of atheroma.

Aneurysms of the arch are now and again passed lightly over as simple aortic obstruction : the exact location and the site of maximum intensity of the murmur, and at times its peculiar whirring sound, will generally excite a suspicion that is confirmed by detection of one or other of the diagnostic signs of aneurysm, and by the absence of the signs of aortic obstruction.

Sometimes systolic murmurs generated at the pulmonary orifice are transmitted into the aortic area ; this is more likely to occur with organic than with functional murmurs, on account of their greater loudness ; their maximum intensity is to the left of the sternum, and they are not conducted into the vessels of the neck ; moreover, the enlargement of

the heart, if any, is of the right ventricle, and not of the left.

The treatment of aortic obstruction consists, for the most part, in giving full play to the vis medicatrix naturæ. So long as the general health is good, and the obstruction of moderate degree, the evolution of compensatory hypertrophy keeps pace with the need. Those measures, therefore, are indicated that promote general well-being, and preserve the heart from undue strain. One cannot arrest, one cannot conceivably influence the existing local disease, except in those rare cases of recent syphilitic origin, in which iodides and mercurials, pushed energetically, are of much advantage. Possibly, if high arterial tension is present, this malign influence may be somewhat abated by diet, by attention to the bowels, and by drugs that lower arterial tension. When the obstruction has reached a stage at which secondary dilatation sets in, rest must be rigorously enforced, and every effort made to spare the work of the left ventricle. Henceforward, the struggle is an unequal one, with the advantage always on the side of the disease. The left ventricle is in face of the same difficulty as besets the right ventricle in mitral stenosis: the attempt to increase its power is the surest and quickest way to exhaust it. All that can be done is to reduce to a minimum the demand for work, while relieving, as far as may be, and as they arise, the successive effects of the progressive heart failure.

THE LIVER AS A TOXIN FILTER.[1]

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It is hard to escape from the tyranny of a fixed idea however erroneous. Ever since the days of the Haruspices, the liver, for reasons as obvious as illogical, has been regarded as part of the digestive system.

In early days, the facts that it came in direct contact with the stomach, and had a duct opening into the intestine, through which was poured a large amount of strikingly coloured secretion, were quite sufficient to establish the accuracy of the belief. So vivid was the colour of the bile, so marked was its effect upon the naked-eye characters of the stools, that one could hardly blame the fathers of medicine for giving it a most exaggerated rank and importance among the secretions. The slowness, with which even the scientific mind rids itself of ancient error, could hardly find a better illustration than in the recession of this belief. It was only about a century ago that the first crude experiments in digestion, outside of the body, with the various fluids and juices, showed the bile to be possessed of absolutely no active, digestive, or fermentative properties whatever. Still there was so much of it, and it came in so high up the alimentary canal, that it must be of great digestive importance, and its next utility was alleged to be that of neutralising the acid chyme, and precipitating the peptones, so that the trypsin of the pancreatic juice could act upon them. With the discovery, however, that trypsin, unlike the feeble pepsin of the stomach, was capable of acting in either an alkaline, a neutral, or even an acid medium, this alleged function also disappeared. Next, its action as an intestinal antiseptic was adduced, but this vanished into thin air, by demonstrations in the pathological laboratory that it not only did not inhibit the growth of organisms, but furnished an admirable culture medium for them. Then came the discovery that the stercoremia and clay-coloured stools, alleged

[1] Read before the Eastern Oregon District Medical Society.

to be due to absence of bile from the intestine, were really due to the presence of excessive amounts of undigested fats due to pancreatic obstruction, and, when these were dissolved by shaking with ether, the normal colour of the stool reappeared and bile was often found to be present. So that its last remaining utilities are those of a promoter of absorption of fats, by its action upon the walls of the intestines and upon the cells, the real work of fat digestion being, of course, close by the lipase of the pancreas, and the intensifying effect of its alkalinity upon tryptic digestion. Both of which are chiefly due to its salts and alkalies, and may be fairly regarded as examples of Nature's ingenious utilisation of any useful properties whatever, possessed by an excretion, which happens not to pass directly out of the body. In short, the physiologist, the comparative anatomist, and the biologist unite in regarding the bile as, in the language of Landois, "a metabolic excretion, playing only an insignificant part in the process of digestion."

To administer it as a remedy for intestinal disturbances would be about as rational as giving capsules of urea in Bright's disease.

Of late years, belief in the digestive function of the liver has received support from another and unexpected source, namely, embryology. It is gravely argued that, whereas the liver, like the pancreas and peptic glands of the stomach wall, is developed by the budding and rebudding of a patch of the intestinal epithelium (entoderm), its function must therefore correspond with its origin. The fallacy of the syllogism, however, needs scarcely to be pointed out. While the study of origins gives exceedingly valuable indications of probability as to the function of an organ, it has absolutely no conclusive force whatever. The lungs, for instance, are also budded off from the primitive alimentary canal, and yet no one would seriously regard their function as digestive, or consider the CO_2, which they pour out into the upper part of that tube, as a digestive secretion. The same is true of the thymus, the thyroid, and the anterior lobe of the pituitary.

The central nervous system and the sweat glands are alike formed by infolding of the ectoderm, and yet no one would claim that perspiration and thought performed the same

function, or were even analogous, although they may be synchronous.

The second step, however, in the development of both liver and lung, gives us a clue to their ultimate and essential function, and that is the enormously complex mesh of blood vessels breaking up into secondary capillaries, and reuniting to pour on into the right side of the heart in one case, and into the left in the other, showing distinctly that, in both cases, some influence upon the composition of the circulating blood is the keystone of their structure. Both alike retain the hollow stalk, by which they budded off from the alimentary canal, as the discharge pipe of their waste products; in the one CO_2, in the other bile, and both of these excretory ducts empty at most irrational and inconvenient stations in the canal. The lungs pour their flood of expired air, and draw in their stream of oxygen directly athwart the intake portion of the food passages, requiring a complicated trap and valve apparatus to prevent a fatal commingling of the two currents of air and food.

The liver pours its fluid waste above, and practically into, the most active and important site of digestion in the alimentary canal, and it is only, by the exercise of the rarest ingenuity, that nature has succeeded in making it no hindrance to the progress of digestion.

However much we may differ as to the precise degree of limited usefulness, in the digestive processes, possessed by the liver, it is evident that its principal *raison d'être* must be sought elsewhere.

The moment that we clear our vision of the ancient digestive obsession, another function of the liver at once springs into view, and that is as a toxin-destroyer, or poison filter, for the blood in general, and that of the portal system in particular. This was first pointed out by the morphologists, who showed that extirpation, or ligation, of the blood vessels of the liver in the lower vertebrates was promptly followed, not by mere impairment of digestive power, but by a rapidly fatal group of toxic symptoms, ending in coma, with or without convulsions, and by death, similar to those of acute poisoning, whether metallic or bacterial.

The experiment was carried a step further, and the blood

from the portal vein diverted, by means of a fistula, directly into the vena cava, without passing through the liver, and again symptoms of acute intoxication developed, which soon proved fatal, although less rapidly than when the hepatic artery, or vein, was also ligated. Then blood was taken from the portal vein of one rabbit, and injected into the tissues of another, and found to be markedly toxic, while that drawn, under similar conditions, from the vena cava on the cardiac side of the liver, was found to be only very mildly so. The conclusion was arrived at, some ten or twelve years ago, that the most important and essential function of the liver was that of a reducer and detoxicator of toxic substances, contained both in the portal, and in the (hepatic) arterial blood. Within the past few years, this conclusion has begun to penetrate into pathological and clinical realms.

I propose to enquire how this function of the liver is found to fit in with its behaviour in disease, and with the results of therapeutic measures. To begin with the simpler functional disturbances, what light does it throw on the renowned and redoubtable symptom-complex, so incapable of accurate definition, and yet so concrete, "biliousness?" Instead of being clumsily regarded as a clogging of the liver by agencies unknown, or, with even more infantile logic, as due to the quantities of food pouring in upon it for "making into blood," and thus preventing the organ from forming that important digestive secretion, the bile, it is simplified to the degree of translucency, as the pouring into the portal vein, or portal blood, of extravagant amounts of toxins, acetone, butyric acid, etc., etc., the products of intestinal fermentation, or putrefaction, in such quantities that the liver is unable to reduce, or even arrest them, and allows a moiety to pass on into the general circulation, producing the familiar headache, loss of appetite, drowsiness, and general feeling of depression. Clear the alimentary canal, either by a sharp purge, or a combination of this with intestinal antiseptics, like calomel, or even pour in considerable amounts of some non-poisonous antiseptic without purgation to stop the formation of these poisons, relieve the pressure upon the liver filter, and the whole symptom-complex clears up. It should of course be premised that, while this action of the liver on the portal blood is spoken of as though it

was relatively definite and simple, it is on the contrary highly complex, consisting of at least three groups of activities. First, the transformation of acutely poisonous products of intestinal digestion, or bacterial action, into relative harmless substances which become constituents of the bile. Second, the building up of certain low group radicals, resulting from the decomposition of food, such as ammonia, amido-acids, lactic acid, and aldehydes into harmless and non-poisonous products, like urea and uric acid. Third, the probable elaboration of certain groups split off from both proteids and carbohydrates in the process of digestion into serum albumen, globulin, glycogen, and other constituents of the body tissues.

Next the famous so-called "catarrhal" jaundice, whose occurrence has been explained by the rather far-fetched hypothesis, that, by virtue of certain catarrhal processes involving the duodenum, inflammation is set up, first in the Ampulla of Vater, and later in the lining of the common bile duct. This travels upwards against the current of the bile, the influence of gravity, and common probability, until it finally either reaches the substance of the liver, or produces sufficient intumescence of the mucous membrane of the bile passages to obstruct the flow of bile.

That this does occur in some of the severer cases, post-mortem examinations have clearly shown, but it is hard to believe that this peculiarly localised duodenal catarrh, severe enough to obstruct one of the largest ducts in the body, can occur in more than a small percentage of the cases of this common affection.

Overloading an excretory organ with poisons for reduction will check its secretion, and produce congestion and stasis as readily as blocking its duct.

From the new point of view, the process becomes one of increase of destructive tissue metabolism in various, or all parts of the body, due to the invasion of the toxins of one of those mild infections, which we term a "common cold," or of any exanthem, or to an autotoxemia. Products of this excessive katabolic metabolism are carried to the liver in excess of the power of the latter to reduce and excrete in the form of bile, consequently some of them pass on through the liver into the vena cava, and are again distributed over the general system

to be deposited in the subcutaneous tissues, and give rise to the well-known yellow colour of jaundice.

I am well aware that this raises the famous *hematogenous-hepatogenous* controversy, whether the bile is formed in the tissues, or in the liver. This, however, is really not material, for several reasons: first, that the controversy, like the even more celebrated theological one over Homoiousion and Homoousion, has resolved itself largely into a battle of definitions. Most of the earlier observers, and several of the more recent ones, like Minkowski, Stadelman, Hunter, and Naunyn, declared most positively, and their declarations seem to be supported by their elaborate and ingenious experiments, that if the liver is cut out of the circulation, no matter how much broken-down hæmoglobin may be thrown into the blood, no bile-substances are formed. On the other hand, several observers of more recent date, like Croftan, have shown good grounds for the belief that the bile substances are formed actually in the tissues, and only picked out by the liver, just as urea is by the kidney; so that we are quite justified in regarding the yellow colour of jaundice as due to the formation in excess of the bile pigments in the tissue themselves.

But there is another reason why the issue of this controversy is immaterial to us, and that is, that even though the bile pigments, bilirubin, etc., may not be formed in the tissues themselves, an isomeric, and, by naked-eye tests, absolutely indistinguishable compound, hæmatoporphyrin, is formed in the tissues in abundance and would fully account for the yellow discolouration of the latter. In other words, it makes little difference whether bilirubin, or its immediate precedent in the decomposition of hæmatin is formed in excess in the tissues, as either would account for the colouration. Further than this, Virchow seems to have proved clearly that, under certain abnormal conditions, the various tissues of the body have the power of forming unquestionable bilirubin from hæmatin. This view is further supported clinically by the fact that the general symptoms, which accompany so-called catarrhal jaundice, are more frequently those of the toxin, which has given rise to the catarrh, than those of bile poisoning. The rapidity with which the condition will appear and disappear, its occasional epidemic character, and the extra-

ordinary variety of infections, and other disturbances, which will give rise to it, also point in the same direction.

I think that most of us have got over the ancient mental habit of regarding jaundice as, in any sense, a distinct clinical entity, or even as a part of any one definite symptom-complex. It is almost as often a symptom of overloading of the blood with certain nitrogenous excreta, containing colouring matter, in excess of the power of the liver to reduce and excrete them, as of obstruction of the bile-ducts. The various forms of this latter, being purely mechanical, may be appropriately left to the surgeon, and need not be considered here.

The more carefully I have watched the course, and investigated the history, of my cases of jaundice, the more surprised have I been at the variety of causes which may give rise to it. First of all comes influenza, and the innumerable other forms of mild and acute infections which we misname by the absurd designation of "colds." Eight-tenths of these latter are infections pure and simple, and are produced, not by cold air, but by hot, stuffy, infected air in sleeping cars, hotel bedrooms, churches, theatres, and the sensation of chilliness, which is supposed to indicate that we were sitting in a draught, and is really the rigor which precedes fever.

It may be also an incident, in the course of the various forms of tonsillitis, in diphtheria, in scarlet fever, in measles, in typhoid fever, in pneumonia, as well as in summer diarrhœas and so-called dysenteries.

This brings us to the severer forms of jaundice, the *icterus gravis* of the old text-books. Here, I think, the old obstruction and resorption theory is almost ludicrous in its inadequateness, while the poison-filter view fits with the facts perfectly.

First of all we have those which are associated with the severer disturbances of the liver, those in which the intoxication, or infection, as the case may be, so to speak, focalises in the liver. First among these comes the well-known idiopathic hepatitis, Weil's disease, which would appear to be a simple infection of unknown origin, whose organism, or toxin, has a special predilection for the liver, disturbing and disorganising its metabolic processes to such a degree that it either permits the precedents of the bile to pass on

unchanged, or is unable to completely reduce and excrete them.

Next, and closely allied to this, comes the case of typhoid fever, in which jaundice appears. About two years ago, I had the opportunity of seeing two of these cases within as many months. In both of them, the disturbance was in strong, vigorous young men, and began with a headache, backache, fever and drowsiness, rapidly followed by jaundice. Examination of the liver showed the latter to be distinctly enlarged, the gall-bladder apparently distended, and the whole region tender on pressure. In the first, Weil's disease was suspected, until about the eighth day, the agglutination test was secured with the serum, the jaundice began to diminish, and the fever ran a typical course, ending in recovery. The second case ran a nearly identical course, except that the jaundice was never so deep, and, from the start, the typhoid symptoms were more prominent. I have since succeeded in collecting reports of four other similar cases from my colleagues here, and it would appear to have been simply a matter of focalisation of the infection in the liver, with disturbance of its detoxicating mechanism, absorption of the bile, or its precedents, and the irritation of the gall bladder from the abnormal character of the bile secreted.

Next, in clearness and complicity of origin, comes the classical acute yellow atrophy of the liver. Here we appear to have a disease, whether of direct infection, as seems most probable, or of secondary toxæmic origin, whose toxin has a special tendency to attack the liver, with a general course of rapid breakdown and cloudy swelling, fatty degeneration, and ultimate absorption with shrinking.

A more striking illustration of the results of the destruction of the chief poison filter of the body could hardly be afforded than this disease.

The restlessness, the pain, the rapid wasting and intolerable itching, and the final development of coma, with or without convulsions, Cheyne-Stokes respiration and death are a perfect picture of a rapid cumulative poisoning by toxins, which the liver is unable to remove or neutralise. Nothing short of our fixed delusion, that the bile is the most important disturbing element to be considered in jaundice, could, I think, have so long

blinded us to the nature of a process so similar to other acute and rapidly fatal infections. It is to this extent paradoxical, in its afebrile, and even in its hypothermic course. Profound hæmatogenous jaundice is set up, as shown by the bloody vomit and yellowness of the skin, a rash may appear, in fact everything, except the regular and definite occurrence of a rise of temperature, is identical with an acute infection. This last requirement, fever, is only one of the many symptoms of infection, and may, or may not, be present. In fact, in many of the severer and more rapidly fatal forms, it is not present at all.

Next comes the jaundice of the newly born, the so-called *icterus* or *melæna neonatorum*.

This is dependent upon changes, probably toxic in character, with excessive hæmolysis, and deposits of hæmatin and its derivatives. From the simple "benign" form, popularly known as "yellow gum," which would appear to be little more than an exaggeration of the rapid changes in the red-blood cells associated with the destruction and disappearance of the nucleated reds of embryonic life, up to the rapidly fatal melænic forms, it is a series of blood changes pure and simple. The severest form of all is now clearly recognised, as being due to direct infection through the umbilical cord, and they all so closely resemble the other infections, with the sole exception of that entirely unnecessary factor, a rise of temperature, that the suggestion, which appeals to us as being the most rational, is that they are due to infection of the body by bacilli, through the open umbilical cord, or through the respiratory passages, or the intestines, all of which now become for the first time populated by bacteria. Here there is no supposition that the liver is the primary seat of the trouble, as this organ is usually found post mortem to be singularly little affected, so far as naked-eye appearances are concerned.

A group of hæmatogenous forms of jaundice, which even the most enthusiastic hepatogenists have hesitated about claiming, is the variety of vivid discolourations of the tissues, which occur in the course of fatal forms of various acute infections. In one of them, this destructive blood change has been so constant that it has given the name to the disease, namely, yellow fever. The typical staining of the mucous

membranes and tissues, and the "black vomit" of disorganised and transuded blood from the alimentary canal, are both due to the remarkably rapid and violent hæmolysis produced by the toxins of the disease. A similar state of affairs may occur in any of the acute septic infections. My attention, for instance, was first called to it in a fatal case of puerperal septicæmia, and next in one of appendicitis, and almost any practitioner, of twenty years' experience, can recall instances in pneumonia, in the last stages of typhoid, in puerperal eclampsias, and in the infections which end the course of diabetes. Here there is no question of the liver being specially attacked, or of the bile passages being obstructed, but simply of the formation of a poison, which dissolves and breaks down the hæmoglobin in such enormous amounts that the liver is utterly unable to deal with it. Evidently the jaundice is a mere symptom, and it would be well if we would so regard it in the milder forms.

Hitherto we have been considering those forms of hepatogenic inadequacy, which are demonstrated to the naked eye by the occurrence of jaundice; this, however, probably forms only a tithe of the conditions due to hepatic inadequacy. An adequate discussion of this would lead us to an extent entirely incompatible with the limits of a single paper, so that we must content ourselves with the merest outline considerations.

First of all, we have those conditions, in which there is a distinct change in the liver substance, which is discoverable after death, for instance, in acute phosphorus poisoning. This so closely resembles acute yellow atrophy in its course that the question has been gravely discussed whether they are not one and the same disease. It is often accompanied by jaundice, though not invariably so, and a principal point of interest is that, although the destruction of the liver cells and their fatty degeneration is due to the action of the drug, the death of the patient follows from an auto-toxæmia, due to the inability of the liver to reduce the poisons formed in the tissues. In other words, although one is of probably infectious origin, and the other due to a metallic poison, in both phosphorus poisoning and yellow atrophy, the patient dies from the same autotoxic cause, and with the same symptom group.

Similar in character, but milder in degree, are those

hepatic disturbances, usually more chronic in form, and consequently associated with fibrosis and even hypertrophy, instead of fatty degeneration and atrophy due to lead, alcohol, and arsenic. All appear to act in a similar manner, by injuring the liver tissue, and by thus preventing the detoxication of the poisons found in the blood, both of alimentary and of metabolic origin.

The interesting experiments of Boix, however, appear to have shown that, in the case of alcohol, it is not the direct toxic effect of the drug, so much as the catarrhal and other irritative changes, set up by it in the intestines, which produce the poisonous products, which are carried to the liver, and cause the irritation and degeneration of that organ. In other words, unless alcohol is taken in sufficient amounts to disturb gastric and intestinal digestion, it will not produce the celebrated hobnail liver—a liver which, by the way, later researches have found to be little more common in drunkards than in the average of the population. Another consideration to be borne in mind is the rapidly fermentable fruit and malt sugars, esters, and higher alcohols, which are also present in wines and beers, and which our experience in gout conclusively shows are more closely concerned with fermentative changes in stomach and intestines than is the alcohol itself.

The experiments of Boix on animals showed that the most certain and rapid production of hepatic cirrhosis was by the injection of butyric, lactic and acetic acids, which are common products of fatty and carbohydrate metabolism in the small intestine.

The mixture of moderate amounts of alcohol with these was found to actually neutralise instead of increase their toxic effect.

Next comes the group of disturbances popularly, and even professionally, known as biliousness. The comfort of "the liver," as a satisfying explanation of innumerable disquieting symptoms, which we are unable otherwise to explain, is simply incalculable. One of the advantages of this view of hepatic functions is that, while demanding that we should use it with greater accuracy, it by no means deprives us of this "blessed word Mesopotamia," but rather justifies it. To cover, as well as may be, such an enormous group in a few words, an excess

of fermentation in the alimentary canal, or a toxic destruction of the red-blood cells, or a lowering of the functional capacity of the liver, so that it can no longer deal adequately with the results of the two former, may result in the passing on into the general circulation of imperfectly reduced poisonous products from either the portal vein, or the hepatic artery, with the consequent discomfort and disturbance known as biliousness.

The treatment, of course, varies with the condition, whether a mere alteration in the amount or quality of the food supply, or a cathartic to sweep the whole mass out of the intestines; an intestinal antiseptic, a cardiac tonic to increase the vigour of the general circulation and the rapidity of the flow of blood through the liver; an antitoxin for some definite toxic condition; a diuretic, or diaphoretic, to clear out the waste substances in the blood.

Last, and most frequently, "something to act on the liver." We know of nothing capable of this interesting effect, and, if we did, it would probably simply further complicate the situation. All drugs supposed to act on the liver have now been shown to sweep clear the alimentary canal, to check the intestinal putrefaction, to increase the blood flow through the liver, or to stimulate the elimination by other organs, such as the kidneys, or skin, or to be pure humbugs, and the last class is by no means the least in number.

Lastly, we reach a field of great interest and importance, which is only just opening up, and that is the reports from various sources incriminating toxic and degenerative changes in the liver as one of the principal factors in diseases, which were supposed to have nothing whatever to do with that organ.

First, and most interesting among these, has been the brilliant work of Whitridge Williams upon the changes which take place in the liver in hyperemesis gravidarum and puerperal eclampsia. It had, of course, long been known that, while the most striking changes in the latter condition were, in a majority of cases, found in the urine and kidneys, some of the severest forms were attended by no albumen in the urine, while the kidneys after death were found almost unaltered. It was, therefore, necessary to look farther back, and it was soon discovered that the liver showed distinct and constant changes in this disease, and it has now established that a

well-marked form of cloudy swelling, going on rapidly to fatty degeneration and atrophy, is one of the most constant changes, that a tendency to this sort of change exists all through pregnancy in relatively normal cases, and that it only needs the addition of some comparatively mild toxic agent to carry this over into a degree of disturbance, resulting in dyspnœa, coma, and death. In short, in the pregnant woman, an excess of excretory materials is poured into the blood, and it apparently takes, as it were, but a straw to throw the already overloaded liver off its balance, and set up degenerative changes in it, which result in the rapid accumulation of poisonous products in the blood.

Puerperal toxæmia, as we now know, may range through all degrees, from mild toxic disturbance up to violent convulsions, coma, and death.

It is also probable that some of these excretory toxins are neutralised by the thyroid, which has long been known to enlarge during pregnancy.

More recently, Bevan has reported a group of deaths, following chloroform anæsthesia, beginning with restlessness, headache, acute discomfort, and deepening into chills, blindness, coma, and death, and found to be associated with an acute fatty degeneration of the liver, due to the direct toxic effect of the anæsthetic.

Again the symptoms are due, not to the toxic effect of the anæsthetic itself, from which the patient usually has recovered long before these symptoms develop on the second or third day, but to this destructive action upon the liver cells and the consequent accumulation of poisonous excreta in the blood. Bevan has succeeded in collecting some thirty cases, and no less than twelve others were added, in the discussion of his paper, from the experiences of those present.

Careful studies of the condition of all the organs in the body, at autopsy after pneumonia, have shown constantly marked inflammation and degeneration of the liver in that disease. So striking is this, that, in some of the most virulent forms, such as are found in our western mining camps, the liver appears to be the organ principally affected, rather than the lung. A curious illustration of this was given, in a recent epidemic of pneumonia, in the mining camp at

Tonapah, Nevada, with a death rate of eighty per cent., in which, on account of the intense pain in the region of the liver, the occurrence of jaundice, and the remarkable blackening of this organ found after death, the disease was popularly known as "Black Liver" or "Black Death of the Liver."

It would appear that, here again, as under other conditions, the liver is the principal protector of the body tissues against toxins from whatever source; and that the question of the degree of systemic invasion is largely a question of the degree to which it can rise to the emergency.

I think most of us have been struck with the curious similarity of the final syndrome in a large percentage of our fatal cases. No matter from what source the poison comes, whether through a pure infection, or an acute poisoning, or a chronic auto-toxæmia, a very large percentage of our patients die after the same fashion. There is the familiar group of headache, drowsiness, loss of vision, Cheyne-Stokes respiration, increase of expiration over inspiration, coma, convulsions; and death closes the scene. Whether the cause of death is pneumonia, yellow fever, phosphorus poisoning, surgical sepsis, puerperal eclampsia, diabetes, or nephritis, the dying picture is so similar that one cannot help being strongly inclined to the belief that death, in all these cases, is due, not so much to the original toxin, which destroyed or damaged the particular organ involved, as to the gradual accumulation in the tissues of the poisonous products of their own metabolism. In fact, to coin an expression, this system group stands for "liver failure." With positively inspired stupidity, we still term this system group "uræmia," although we have known for twenty years: first, that urea has almost no toxic effect, and is incapable of producing this group of symptoms; second, that it is not present in excess in the blood in this condition; third, and finally, that this condition is probably due to the incapacity of the liver to form urea out of its much more poisonous precedents. In short, if we must drag in urea, the proper name would be anuræmia.

SERUM-THERAPY.

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(*Continued.*)

Use of antistreptococcic serum in *scarlet fever*.—The pathology of scarlatina is not definitely established, but it is quite certain that streptococci are constantly, or almost constantly, present in the throat and in the blood in severe cases, and that the secondary lesions of the disease are usually due to their activity. The differences of opinion arise on the question whether the organism found in the throat is a definite one peculiar to scarlet-fever and the cause of the disease, or an ordinary streptococcus forming a common but not necessary secondary infection. In the former case, an antistreptococcic serum would have to be prepared specially for this streptococcus, in the latter we might expect any polyvalent antistreptococcic serum to be equally effective. Moser's[1] serum has been prepared on the former supposition by means of streptococci isolated from scarlet-fever cases, and the sera prepared by Marmorek, Aronson, Bujwid, and in the English laboratories, have been used on the latter. The results have been very doubtful. The serum has been chiefly used in severe cases, and, since the selection of these cannot be conducted with strict accuracy, the interpretation of the results must be doubtful. Bagnisky[2] found Marmorek's serum useless, and yet slightly better, but still not brilliant, results with Aronson's. Mendelsohn[3] obtained no good results with the latter. Other writers (Escherich, Ganghofner, Quest, Bokay, etc.) have reported better results, but their figures are far from conclusive. On the whole Moser's serum appears to have been the most successful.

The use of antistreptococcic serum in articular *rheumatism* has attracted some attention. The serum used is that prepared by Menzer, streptococci of human origin being used. It appears to cause an inflammatory reaction around the affected joints, and hence Blumenthal has considered that it contains free toxin, which acts like tuberculin, and this appears to be very probable. There is at present no large

series of cases treated in this way, and the chief evidence in favour of the serum is derived from a few very striking results published by Menzer[4] himself. Thus, one patient suffering from chronic rheumatism of some years' standing and apparently entirely disabled was greatly benefited after five months' treatment. Good results have also been obtained by Kanel.

The treatment of *anthrax* has made very substantial progress, several sera which are now obtainable appearing to be of very decided value. The best known is Sclavo's, which is obtained from the sheep or ass. The process consists in first immunising the animals by Pasteur's method of the two vaccines, and following this by repeated large injections of virulent cultures mixed with gelatine, which appears to obviate the formation of abscesses. The process lasts for a long time after immunisation is apparently complete. It has been largely used on the Continent (Bormans[6] collected three hundred successful cases up to July, 1903), and several cures by its agency have been observed in England. These have been collected and analysed by Legge,[7] in an excellent paper to which the reader is referred. The initial dose is 20–40 c.c., which is to be repeated in twenty-four hours if necessary, or four or five doses of 20 c.c. each are sometimes employed. Here again[8] intravenous injection has been recommended for the first dose or two in severe cases. Sobernheim's method of immunisation is somewhat different, and is carried out by injecting the animal with a mixture of bacilli and anthrax serum, a method introduced by Besredka; it is supposed to give the rapid immunisation of the passive method, and at the same time the more lasting immunity obtained by vaccination. The serum has been used mainly for the immunisation of animals, but extremely good results have been obtained in the disease in man.[9] The dose recommended is 20 c.c. and intravenous injection is advisable. It may be followed by a rise of temperature and sweating, and improvement takes place within twenty-four hours: in these features it resembles Sclavo's serum.

The way in which it acts is not fully known. Sobernheim[10] holds that the bactericidal power of the blood is not increased during the process of immunisation to the anthrax bacillus. Cler, on the other hand, shows by an indirect

method that the anti-body, which brings about the first stage of bacteriolysis (amboceptor) is present. Others attribute the action of this serum, and of many others, to the presence of substances which stimulate phagocytosis; thus Cler[11] says that anthrax bacilli are taken up by leucocytes after four or five hours contact with Sclavo's serum, but not after the action of normal serum (the latter statement, by the way, is certainly not true in regard to the serum of man and the horse). But the active substances present cannot be opsonins, for we know now that these are unstable substances, disappearing in a few days, whereas Sclavo's and Sobernheim's sera retain their activity for months. Lastly, there is some reason for thinking that an antitoxin may be present in some at least of the sera. Thus Bandi[12] prepared a serum, which he claims will bring about immediate improvement, a feature strongly suggestive of antitoxic action.

Turning to *typhoid fever*, we find that it is very easy to prepare a bactericidal serum of high potency from horses or other animals, but that such sera are useless in practice; and this applies equally well to the *B. coli* and to *cholera*. In all these cases, the serum, as tested in the laboratory, is an extremely powerful specific bactericidal agent; it is protective, immunising animals against the bacillus in question; and it is, in some measure, curative for test-animals. The reasons for the failure of these sera will be discussed subsequently.

Chantemesse's antityphoid serum is based on a different theory. This observer claims to have prepared a true toxin to the typhoid bacillus by growing it in broth containing spleen substance, and to have immunised horses with this, producing a true antitoxin. He claims extremely good results from the use of this serum, and his statistics certainly go to show that the method is of value. Sir A. E. Wright, however, pointed out, in the debate referred to above, that there is reason for believing that the serum is not antitoxic, but actually toxic, *i.e.*, that it contains the free and active toxin of the typhoid bacillus, and that Chantemesse's treatment is really a process of vaccination. If this is the case, it seems advisable to try simpler methods, in which the dose of the vaccine is more readily controlled. This serum cannot be obtained commercially.

Other writers (Fraenkel, Richardson, Petruschky, etc.) have

suggested various methods of vaccinating in the case of typhoid fever, but I am not aware that any careful trials of these methods have been made. This refers, of course, to vaccination during an attack of the developed disease, not as a preventive measure.

The serum treatment of these diseases is at present useless, and that by means of vaccine should be accorded a trial,

The serum treatment of *plague* is perhaps a little more hopeful, though the most recent report from India[14] is far from enthusiastic as to the results obtained. The best serum was apparently Terni's, in which there was a small reduction in case-mortality, a relief of symptoms, and a lengthening of the duration of life in fatal cases. Others, however, have obtained more favourable results. Duprat,[15] for example, using Roux-Yersin serum, which according to Bannerman did not affect the case-mortality in the slightest degree, in very large doses—200 to 300 c.c.—treated 29 cases with only four deaths, whereas in 16 cases treated with small doses—less than 100 c.c.—there were five deaths. These figures would indicate a lowering of the mortality by more than a half, but they are too small to be of great value. Ernest Hill[16] also found Yersin's serum of value in the recent epidemic in Natal. It is generally held, by those who believe in the efficacy of plague sera, that large doses are advisable ; Calmette also urges the use of intravenous injection.

There are two *antipneumococcic sera* which are obtainable commercially, Pane's and Romer's ; the latter is markedly polyvalent. The dose of the latter is given as 10 c.c., or rarely 20 c.c., and it is only to be repeated if necessary. Pane recommends his serum to be used more freely, several injections of 20 or 30 c.c. being required. Good results have been obtained by both sera. Thus Knauth, using Romer's serum, reported a rapid amelioration in acute pneumonia, including a disappearance of blood from the sputum, improvement in the pulse, temperature, and respiration, and a very gratifying improvement in the subjective condition of the patient. Lindenstein obtained similar results, and urges the early use of the serum. Two unsuccessful[18] cases of pneumococcic endocarditis, treated with Pane's serum, have been recently reported. In one case, under Sir Hugh Beevor, which I had the opportunity of watching, the result was nil.

Several observers have obtained very encouraging results in the use of Romer's serum, in the treatment of pneumococcic ulcer of the cornea (ulcus serpens). The method of administration may be hypodermic [19] (10–20 c.c.), subconjunctival [20] (1 c.c. at first, followed by ·5 cc. every other day), or by instillation of a few drops every three hours.

Dysentery.—Several observers (Shiga, Kruse, Flexner, and several others) have found organisms in cases of dysentery. It is quite certain that some of these may be the actual cause of the disease, whereas the nature of others may be doubted, and the exact relationship of the pathogenic bacilli to one another is still unsettled. Hence the use of any anti-dysentery serum should be preceded by a determination of the nature of the infectious agent by agglutination tests (or by isolation of the organism) and the selection of the appropriate serum. The best studied sera are Shiga's,[21] which serum is extremely potent in laboratory tests, and which its inventor claims to have lowered the mortality of dysentery by nearly a half; and Kruse's,[22] which appears to be of much less value in practice. Good results have, however, been attributed to Kruse's serum in dysentery in children, and it has been used in the summer diarrhœa of infants in America, apparently with benefit.

Anti-dysenteric serum appears to offer more hopes of usefulness than the other bactericidal sera, though other observers have not obtained results equal to those of Shiga.

The serum supplied by the Lister Institute, prepared by Todd's [23] method, is supposed to be antitoxic as well as bactericidal. It is obtained by a very cautious immunisation of horses with the filtrate from broth cultures of dysentery bacilli, and has an undoubted antitoxic effect when tested in the usual way. I am not aware that any extended series of results, obtained by its use has been published.

Space does not admit of reference to the sera directed against tubercle, cerebrospinal fever, gonorrhœa, cancer, malaria, hydrophobia, staphylococci, serpent-venom, syphilis, yellow fever, etc., etc., and the serum treatment of diseases such as exophthalmic goitre is beyond the scope of these articles.

(*To be continued.*)

(*N.B.*—The references to the literature on this subject will be found at the end of the concluding portion of Dr. Emery's article in the next number of THE PRACTITIONER.)

THE DIAGNOSIS OF PLEURAL EFFUSION, AND OF EMPYEMA IN CHILDREN.[1]

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For our consideration this afternoon, I have selected a subject which may any day come before the general practitioner. I have been specially led to discuss the diagnosis of pleural effusion because of the mistakes which I have made myself, and because of those made by others which have come under my notice. These mistakes have convinced me of the necessity for reviewing, from time to time, our opinions on the physical signs of disease, and subjecting them to the criticism of our actual experience. In what follows, I do not offer you anything that is really new, but I hope to emphasise some points which seem to me very apt to be overlooked, and which have led to the mistakes to which I have referred.

First, as to the diagnosis of pleural effusion. We are all familiar with the main physical signs of that condition, which I may briefly recapitulate :—

Defective movement.
Dulness on percussion.
Deficiency, or loss of respiratory murmur.
Deficiency, or loss of vocal fremitus.
Deficiency, or modification of vocal resonance.

I do not include the displacement of adjacent organs, or the bulging of the intercostal spaces, because these are so characteristic of large pleural effusion that the occurrence of either of them is sufficient to preclude a mistaken diagnosis. My remarks, therefore, will apply to cases of the disease in which the effusion may be sufficiently large to give rise to the signs enumerated above, but not so large as to cause displacement, or bulging.

Teachers have been in the habit, and very properly so,

[1] A lecture delivered at the Medical Graduates' College and Polyclinic.

of insisting on these signs, and contrasting them with the signs of consolidation, as in pneumonia, viz. :—

Defective movement.
Dulness on percussion.
Tubularity of the respiratory murmur.
Increase of the vocal fremitus.
Increase, or modification of the vocal resonance.

While the above signs are met with in the great majority of cases of effusion, and of consolidation, respectively, and, while teachers and text-books alike indicate that, in other instances, difficulties in diagnosis may arise from the phenomena of effusion closely resembling those of consolidation, the latter fact is very apt to be overlooked. It is this that leads to the commonest mistake met with in practice, namely, regarding a dulness over the pulmonary area as necessarily due to consolidation, if the respiratory murmur heard over it is tubular. It cannot be too strongly insisted on that, in a certain number of cases of pleural effusion, and by no means a small one, the respiratory murmur is markedly tubular.

How then, in such cases, is a correct diagnosis to be made ? I believe, by the vocal fremitus. With defective movement, dulness on percussion, and great deficiency, or loss of the vocal fremitus, you may be practically certain that you are dealing with a pleural effusion, though the respiratory murmur may be most typically tubular. I am not going to discuss the physics of this fact. For our present purpose, the fact is the important thing, not its physical explanation. So far as I know, no generally accepted explanation has been offered, the difficulty largely arising from the fact, that the physics of the human body cannot be exactly reproduced in the laboratory.

It is also, I believe, a fact that tubularity of the respiratory murmur, either articulate or distant, is met with only in moderately large, or large effusions, and in inflammatory much more readily than in simple dropsical effusions in the pleural cavities. It is further to be noted that this tubularity may not be confined to the space along the side of the vertebral column, where the lung is said to lie compressed in pleural effusions, but may be audible all over the dull area.

In very slight effusions, in which the dulness rises only a couple of inches or so from the base of the lung, the respiratory murmur seldom presents this character; it is generally very weak, or entirely lost.

Another less frequent source of mistake is the occurrence of a tympanitic note over the upper part of a chest in which there is a large pleural effusion; but Skodaique resonance is so striking a fact that most men remember about it, and do not, in such circumstances, make the mistake of thinking that they are dealing with excavation, or pneumothorax. The dulness met with below the area of Skodaique resonance is enough to distinguish the case as one of large pleural effusion.

Having carefully considered the history of the case, and the symptoms as well as the physical signs, if there is still doubt as between effusion and consolidation, an exploring needle may be inserted. Generally, this is effective, but, in a few cases, fluid may not be discovered even when present in large amount. This failure is due, sometimes to the needle not being long enough to penetrate the thoracic wall, at other times to the thickened costal pleura being driven forward in front of the needle, and yet again to the needle becoming plugged with a clot of blood, or of fibrin, or other material in the fluid; but, occasionally, there seem to be at work other causes of failure which are not understood.

As signs of value in doubtful cases, I have omitted such evidences as the shape of the upper line of the level of dulness, a blood count, etc., not because I undervalue these refinements of diagnosis, but because they are not suited to the everyday work of the general practitioner. Indeed, they are not always to be depended upon in the hands of the hospital physician, who has the best opportunities for practising these methods of examination, and so acquiring skill and confidence in the manipulations involved.

Having concluded from physical examination alone that fluid is present in the pleural cavity, the next question is as to its nature. A pleural effusion may consist of serum, pus, or blood. I do not mention chyle, as that is so rare, and I will dismiss blood from consideration, as that is almost always due

to malignant disease of the pleura, or to rupture of an aneurysm, diseases probably recognised apart from the effusion.

Have we, then, any trustworthy signs by which we can, in a doubtful case, determine whether an effusion is serous or purulent? I believe not. Those commonly mentioned are:—

1. Temperature. A chart with marked oscillations of temperature is regarded by many as significant of purulent effusion. In my experience, such oscillations are equally common in serous effusions, so many of which are really of tubercular origin.

2. Rigors and sweating. These also are not characteristic of pus; they are frequently present in the case of serous effusions, and absent in purulent.

3. Vocal Resonance. We have been told that, if there is whispered pectoriloquy over the dull area, it means serum and not pus, while bronchophony, it is said, may be present, if the effusion is purulent. That distinction is not to be depended upon; I have heard the most marked pectoriloquy with the whispered voice in cases of very large purulent effusion.

4. Bulging, redness, œdema, and tenderness over the intercostal spaces no doubt mean purulent effusion, but I hold that the diagnosis should be made long before these signs have developed, and that it is discreditable to wait for them.

5. The history may help, as will be shown later on in speaking of empyema in childhood, but it is not always to be relied on.

In all doubtful cases, recourse should be had to an exploring needle, but the exploration should never be made except in the patient's own house. A hypodermic syringe fitted with a long needle is all that is required. If it is thoroughly sterilised, and the skin thoroughly cleansed, such a needle may be inserted without any danger. If pus is found in quantity sufficient to fill the syringe, it is evident that the case is one of empyema, but, if only a few drops of pus are found, there may be doubt as to whether they came from the pleural cavity, or from the lung. An examination of the pus under the microscope will help to decide the matter. If the pus is from the lung, you will probably find either (*a*) catarrhal cells with carbonaceous pigment in them; (*b*) fragments of yellow elastic lung tissue; or (*c*) some of the pus cells

arranged in rows separated by threads of mucus, as one sees in sputum. In this way, in most cases, it is possible to tell whether the lung has been punctured, or whether it is a case of empyema. One further source of error, however, must be mentioned. In some cases of recent empyema, the fluid in the pleural cavity, when the patient is in the erect posture, separates into two layers, the majority of the pus cells falling to the most dependent part, and the supernatant fluid looking like serum. If the needle is introduced into this supernatant layer, a wrong diagnosis may be made.

All the above applies to both adults and children. I would now direct your attention to empyema in children, in the diagnosis of which mistakes are most apt to be made.

Empyema in childhood is frequently diagnosed as pneumonia. This error has long been recognised, but has not been sufficiently emphasised. It depends on the facts that, in many cases of empyema of acute onset, the history is like that of a pneumonia, and the physical signs are misleading, exquisitely tubular breathing being audible over the dull area. It is to be remembered that, in young children, two objective signs, which are of much diagnostic value in the adult, are generally absent:—(1) A young child has no expectoration, and hence no rusty spit to guide one; and (2) the child's voice is too feeble to give rise to a tangible fremitus, so that it is impossible, on this point, to compare the affected with the sound side.

It is very important to bear constantly in mind this liability to error in diagnosis in the case of children, as the consequences of such an error may be disastrous. As has been already stated, there are many cases in which a diagnosis, as between consolidation and effusion, can be made only by exploratory puncture. This difficulty arises in the case of children more frequently than in the case of adults, and hence it is of importance to indicate the circumstances in which empyema should be suspected.

In all cases in children, in which a diagnosis of pneumonia has been made, empyema ought to be suspected, and an exploratory puncture made:—

1. *If there is undue delirium.*—The pneumonia of childhood is not characterised by much, or wild delirium. If there

is wild delirium, especially if early in the course of the disease, say the second or third day, the disease is probably empyema.

2. *If there is marked oscillation of the temperature.*—In pure pneumonia the oscillations, up to the crisis, rarely go beyond a degree, or a degree and a half; great oscillations, therefore, are very suggestive of empyema.

3. *If there is tenderness over the affected side.*—Marked tenderness on examination of the chest is quite unusual in pneumonia, and always suggests empyema.

4. *If there is any fulness in one or more intercostal spaces in the dull area.*—This is most likely to occur in empyema after more than a week's duration, but may occur early.

5. *If there is prolongation of the fever, with or without acute symptoms, beyond the ordinary period of crisis of a pneumonia.*—Unless the persistence of the fever is explained by well-marked evidence of the extension of the pneumonic process in the same, or in the other lung, empyema should be suspected. In most such empyematous cases, the temperature comes down a degree or two about the fifth or sixth day, and goes on with oscillations indefinitely, the illness becoming apparently less acute, but liable to so-called "relapses." Many such cases find their way into hospital as curious cases of pneumonia.

6. *If there is any doubt, every reasonable precaution having been taken to come to a correct diagnosis.*—This is because of the great importance, in regard to treatment, of an early diagnosis in the case of empyema.

Empyema in children may also be confounded with phthisis pulmonalis. I have made the mistake myself, and I have seen it made by others, even in hospital. The misleading facts here are the presence, in some cases of empyema, of cavernous breath sounds, and large, hollow, moist râles. In most of the cases of this kind which have come under my notice, there has been extensive dulness over one side with, in many instances, Skodaique resonance at the apex. The very extent of the abnormal resonance, in such cases, should make one suspect that the disease is not phthisis, and a careful scrutiny of the history should serve to point to empyema. In some instances, the signs—dulness, tubular breathing and moist, clicking râles—are limited in extent to the apex of one lung, and might readily be interpreted as those of tubercular

excavation. In such cases, the history is the safeguard. All that I have seen have been brought under my notice as cases of pneumonia that did not resolve, but, with or without a slight remission, "passed on into phthisis." These are cases of encysted empyema. The acuteness of their onset is very unlike that of a tubercular lesion, and should raise suspicion leading to exploratory puncture.

That empyema in childhood is of very frequent occurrence, I have no doubt. From my case-books at the Royal Hospital for Sick Children, I find that, in seven years, 1,251 patients were admitted to my ward. Of these, 69 were suffering from pleural effusion, that is, 5·5 per cent.; 43 were cases of serous, and 26 of purulent effusion, that is, fully 38 per cent. were purulent. The cases would have been more numerous, but for the fact that, in the past few years, the house physician has been in the habit, in suspicious cases, of performing an exploratory puncture on admission, and of sending all cases that give pus direct to a surgical ward. The importance of a correct and early diagnosis can scarcely be exaggerated, especially in children under two years of age, who succumb comparatively rapidly to empyema, and rarely recover unless operated on at an early date in the disease.

I have insisted on exploratory puncture as the only sure means of diagnosis in doubtful cases. In my own experience of this practice, now very large, I have never met with any accident, even when a lung has been punctured, which has not infrequently been the case. I have, therefore, looked upon the procedure as perfectly safe. It would appear, however, that occasionally it has been followed by a fatal result. Many of you may have noticed in *The British Journal of Children's Diseases* for October, 1905, an editorial article entitled "Exploratory Puncture of the Chest—Abuse of the Needle—A Warning," an article which is calculated to deter many practitioners from the use of the needle. If it is true, as there stated, that "puncture of the chest is looked upon by the younger members of the profession as a harmless proceeding, and on a par with the use of the stethoscope for the examination of children's lungs," I am quite at one with the Editor in his animadversions on this practice. He has collected eleven cases, in which death is reported to have been

caused by exploratory puncture of the lung, and he very properly insists that every other means of diagnosis should be exhausted before puncture. The record of these deaths is proof that this accident may happen in the hands of the most careful. The same, however, may be said of the administration of anæsthetics, deaths from which are every now and again reported.

The Editor has failed to point out the other aspect of the question, the fact that a considerable number of children are buried, as cases of pneumonia, whose lives might have been saved had the needle been used in time. It is this aspect which has presented itself to me—the ease with which a careful man may make a mistaken diagnosis, and the frequency with which it is made, the mistake being corrected too late for successful treatment. I shall be sorry if the article referred to above should make practitioners afraid to use the needle. If they reserve it for cases in which careful examination and observation have shown that there is doubt as to whether a child is suffering from a pulmonary trouble or from an empyema, they will have little reason to fear any accident, and they will be doing the best for their patients.

THE WASTING DISEASES OF THE REGISTRAR-GENERAL:

AN INQUIRY INTO THE MORTALITY IN INFANCY.[1]

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THE "Wasting Diseases" of the Registrar-General include premature birth, congenital defects, injury at birth, atelectasis, and atrophy. The term does not include tabes mesenterica.

The wasting diseases were the cause of death of 41,800 infants under one year of age in 1903; the infantile death rate being equal to 44 per 1,000 births for the whole of England and Wales. About 90 per cent. of the deaths occurred in the first three months of life.

The following table[2] shows the death rates from the wasting diseases among children under one year old per 1,000 births in England and Wales, in urban and in rural counties, for each sex separately, and for both sexes together, in the quinquennium 1898–1902, and the corresponding rates in the year 1903:—

WASTING DISEASES.

	Males.		Females.		Both Sexes.	
	1898–1902.	1903.	1898–1902.	1903.	1898–1902.	1903.
England and Wales - -	50	49	40	39	45	44
Urban counties - -	50	50	40	40	45	45
Rural counties - -	48	48	38	36	43	42

The outstanding feature of the table is the marked excess of the male rates over the female, an excess reaching as it does to not less than 20 per cent. in each of the three

[1] Being part of a thesis which secured the M.D., with Honours, and the Bellahouston Gold Medal at the University of Glasgow.

[2] Compiled from Table J., *Sixty-sixth Ann. Rep., Registrar-Gen., England and Wales.*

divisions. It will also be observed that the urban rates differ but little from those in England and Wales as a whole, and that the rural rates for each sex are but little less than those which obtain in urban areas for the corresponding period. The rates, in 1903, for England and Wales and for the urban and rural counties are practically identical with those of the preceding quinquennium.

In view of the fact that the year 1903 has almost the lowest infantile mortality figure on record, and that therefore vicarious inclusion of deaths from other causes would be reduced to a minimum, this close correspondence of the rates in the year 1903, compared with the preceding quinquennium, would suggest that here one is dealing with a "constant" in infantile mortality. The rate for wasting diseases has steadily increased during thirty years. The peculiar constancy of this particular infantile death rate will be further referred to presently ; but, in the meantime, it will be of interest to indicate the changes which have occurred in the individual rates in the three principal categories of this group, namely, premature birth, congenital defects, and atrophy, during recent years.

The following table[1] gives the infantile death rates from these causes from the quinquennium 1876–80 to 1903, the quinquennial periods being expressed as averages :—

ENGLAND AND WALES : DEATHS OF INFANTS UNDER ONE YEAR PER 1,000 BIRTHS.

Period.	Premature Birth.	Congenital Defects.	Atrophy.
1876–1880	13·32	1·28	23·4
1881 1885	14·14	1·34	21·9
1886–1890	16·10	1·34	21·9
1891–1895	18·13	1·52	21·4
1896–1900	19·54	1·56	20·4
1901	19·1	3·8	20·0
1902	20·1	4·1	17·8
1903	20·1	4·4	17·5

[1] Compiled from *Annual Reports of Registrar-General.*

It will be noted that a steady rise in the rates for premature birth and congenital defects is associated with a steady fall in the rate for atrophy, but to what extent, if any, this indicates a transference in certification, it is difficult to say.

PREMATURE BIRTH AND CONGENITAL DEFECTS.

The principal factors in the production of premature births and congenital defects are syphilis, tuberculosis, and alcoholism. The *rôle* of syphilis and tuberculosis, though of the utmost importance, is so well known in this connection that, at present, it need only be mentioned to be dismissed. As is well known, alcoholism is recognised as a cause of depopulation. Carpenter[1] is of opinion that parental alcoholism is one of the most potent factors in the production of premature birth, and of various congenital malformations. He cites M. Nicloux, who has demonstrated by experiment the influence of alcohol in the production of deformities, more especially in fowls. From the experiments of M. Fere[2] there is good ground for believing that alcohol tends to produce malformation in the unborn child. It appears from statistics, collected in both France and England, that alcohol in this respect is more powerful than tuberculosis, though less so than syphilis.[3]

It is difficult to say how far the industrial employment of married women conduces to premature birth. It is generally held that it does do so, but the Registrar-General's returns, read in the light of the Census, lend no support to this contention. For example, in Lancashire, the manufacturing towns, such as Burnley, Blackburn, and Preston, have many married women engaged in occupations. The Census Report, 1901, shows that in Lancashire 16·7 per cent. of the married or widowed female population are engaged in occupations. In the county of Durham, on the other hand, only 4·7 per cent. of married or widowed females are similarly returned. Yet the infant death rate, in 1903, ascribed to premature birth, was only 20·1 in Lancashire; and no less than 22·4 per 1,000 births in the county of Durham. A detailed examination of the returns for the different counties in England

[1] Carpenter: "Alcohol and Children," *Journal of State Med.*, 1904, p. 604.
[2] Ballantyne: *Ante-Natal Pathology and Hygiene.*
[3] Carpenter: *Op. cit.*, p. 605.

and Wales failed to disclose any regular association of high death rate from premature birth and the industrial employment of married women.

The deaths ascribed to premature birth and to congenital defects have under both heads increased since 1876-80, and enormously so in recent years. So, too, have the deaths ascribed to injury at birth and to atelectasis. In the absence of any requirement that still-births should be registered, a doubt must remain as to whether the increase is altogether real; or whether it is due in part to a registration of immature and congenitally defective children, dying very soon after birth, who would formerly have been considered as still-born and so have escaped registration altogether. The regular, and, in late years, the substantial increase which has occurred in both rates would, however, suggest that the increase is real and not merely apparent.

These rates must, if considered by themselves, be regarded *par excellence* as an index of the *health conditions* of the mothers in the community, and, as such, they should suggest problems of serious import to those interested in the question of physical deterioration.

ATROPHY.

This cause was responsible for the death of 16,588 infants under one year of age in 1903. The male rate was in excess of the female. A reference to the reports of the Registrar-General will show that over 98 per cent. of all deaths, registered under this heading, occur in children under five years of age, and of these no less than 95 per cent. occur in the first year of life. Of the deaths among infants ascribed to atrophy in 1903, 73 per cent. occurred under three months of age.

The deaths returned under this head are usually certified under such indefinite terms as inanition, malnutrition, or marasmus, the outstanding symptom in all being wasting. The condition can hardly be regarded as a clinical entity, but since I believe that a different interpretation has to be attached to the deaths ascribed to *atrophy* in the early months of the first year, than what pertains to those occurring in the later months, it will be of interest to consider a few points in the ætiology of atrophy in general.

The cause of atrophy in infancy is frequently very obscure. Still[1] believes there would appear to be such a condition as athrepsia, or marasmus, which is not dependent upon any discoverable cause.

Ruhrah[2] has brought forward some observations, showing that wasting is primarily connected with atrophy of the thymus gland.

Starr[3] says that atrophy arises both in breast-fed babies and in those brought up by hand, being, in both cases, due to insufficient nourishment. "The child wastes because he is starved." Vincent[4] would appear to hold the same opinion.

Ashby[5] regards atrophy as the result of improper feeding and unfavourable life conditions. Like Starr, he has noted its occurrence in breast-fed infants. "In these cases, the children have been congenitally weak, or premature, and probably the mother's milk has been deficient in quality and quantity, and they have been exposed to all the insanitary conditions, which prevail in the crowded dwellings of the poorest and most ignorant of our citizens."

Hutchison[6] points out that marasmus is not a disease in itself, but a symptom.

From the foregoing consideration, it would appear that the causes of atrophy may be divided into three broad classes:—

(1) Simple atrophy due to indefinite causes, and probably inherent in the infant.

(2) Atrophy incidental to improper feeding pure and simple.

(3) Atrophy associated with improper feeding and bad hygienic conditions.

The relationship of atrophy to certain other morbid conditions may here be briefly discussed:—

(1) *Atrophy and Diarrhœa.*—Niven[7] has pointed out that the years in which mortality ascribed to atrophy have been highest

[1] Still: *Medical Annual*, 1905, p. 407.
[2] *Brit. Med. Jour.*, August 29, 1903.
[3] Starr: *Dis. of Digestive Organs*, 1901, p. 101.
[4] Vincent: *The Nutrition of the Infant*, 1904, p. 232.
[5] Ashby and Wright: *Dis. of Chn.*, 1899, p. 104.
[6] *Clinical Journal*, March 4, 1903.
[7] *Report on the Health of Manchester*, 1903.

have been years of high diarrhœal mortality, and that since diarrhœa in children is followed by enfeebled condition of the bowels, and by malnutrition, it is possible that the mortality from atrophy is due to diarrhœa to such an extent as to make it difficult to use as a differential expression by itself of special factors, except in so far as these are causative also of diarrhœa. This no doubt to a certain extent is true; but it fails to account satisfactorily for the regular age incidence of atrophy. The large majority of deaths, ascribed to this cause, occur, as has already been pointed out, in the first three months of life. Diarrhœa, on the other hand, claims most victims at the age period, 3 to 12 months, when 71 per cent. of the total infantile deaths from diarrhœa occur.

(2) *Atrophy and Syphilis.* — It is well known that the children of syphilitic parents are born with feeble-resisting power, and are liable to manifest degenerative tissue changes. Definite signs or symptoms of congenital syphilis are not necessarily manifested in the first few weeks of life.[1] It is therefore conceivable that, in many cases of congenital syphilis, there may be no symptoms beyond progressive atrophy. In such cases, quite apart from any question of misrepresentation on the death certificate, it may well be that many early cases of atrophy are in fact syphilitic in origin. Support is lent to this contention by the fact that, of the certified deaths from syphilis occurring in infants, 61 per cent. were at the age period 0 to 3 months, and only 39 per cent. at the age period 3 to 12 months, a distribution that follows closely on that of atrophy.

(3) *Atrophy and Tuberculosis.*—Tuberculosis is not now regarded as a hereditary disease; but the tendency to tuberculosis, with all that this implies of depraved nutrition and feeble-resisting power, is looked upon as transmissible. If any cases of atrophy have to be attributed to tuberculosis, and probably a small proportion should be, it is only in the later months of the first year that this is likely to occur; because a reference to the Registrar-General's Returns shows that, of all tuberculous affections occurring in the first year, only 13 per cent. occur in the first three months of life, and 87 per

[1] Still: "Congenital Syphilis," *Med. Ann.*, 1905, p. 555.

cent. at the age period 3 to 12 months; and, in any case, it is doubtful how many of these deaths are really due to tubercle.

(4) *Atrophy and Parental Alcoholism.*—The part which parental alcoholism plays in the production of infantile atrophy is not capable of complete statistical demonstration; but there is little doubt that it is an important factor, especially when occurring in the mother. Such children are born with feeble constitution, and are liable to fall early victims to various degenerative changes.

The following table embodies the principal points in the foregoing argument:—

PERCENTAGE OF INFANT DEATHS FROM CERTAIN CAUSES AT DIFFERENT AGE PERIODS. 1903.

Diseases Groups.	Age Period.	
	0–3 Months.	3–12 Months.
Atrophy	73 per cent.	27 per cent.
Syphilis	61 ,, ,,	39 ,, ,,
Diarrhœa	29 ,, ,,	71 ,, ,,
Tuberculosis	13 ,, ,,	87 ,, ,,

In reading this table, it must be borne in mind that one is dealing with the figures in the official returns, and that no allowance is made for imperfect certification. There is no doubt that many deaths from syphilis are deliberately returned as atrophy, since, for reasons which need not here be discussed, it is only exceptionally that syphilis is returned as the cause of an infant death. One is not at present so much concerned, however, with the question of correct certification; the object rather being to read beyond the medical certificate, in order that the true significance of the infantile death rate from atrophy may be indicated. Indeed, it appears to me, having regard to the dominant position of syphilis as the underlying cause of other members of the wasting diseases group, that a truer index of infantile atrophy would be gained by its inclusion.

The table also demonstrates that it is rather in the later

age period than in the earlier, that the statistics of infantile atrophy will tend to be vitiated by diarrhœa and tuberculosis.

On the whole, therefore, *early* atrophy may be regarded as an index of inherent weakness in the infant, due in large measure to parental conditions, and perhaps especially to syphilis, tuberculosis, and alcoholism. *Later* atrophy, on the other hand, has to be regarded mainly as an index of improper feeding and bad hygienic conditions; and this further implies parental neglect and want of cleanliness.

The infantile death rate from atrophy has considerably declined during recent years, and this has probably to be accounted for in part by more precise certification—the wasting incidental to more definite causes, such as diarrhœa, etc., being now included under their respective heads.

The rate for the wasting diseases of the Registrar-General taken altogether, and having regard to its increase, and also to its constant, general, and nearly equal distribution (a peculiarity to which attention has already been directed), would seem to imply a marked and increasing physical deterioration of the people; a point which, I think, was not sufficiently emphasised in the evidence submitted to the Inter-Departmental Committee on Physical Deterioration. Congenital syphilis, so far as interpretation is concerned, should be included in this group.

SYPHILIS.

The infantile deaths ascribed to syphilis have varied from a rate of 2·0 per 1,000 births, in 1883, to 1·2 in 1901 and in 1902. In 1903, 1,271 infant deaths were ascribed to this cause equal to a rate of 1·3 per 1,000 births. The percentage of deaths was distributed in age periods as follows:—

	0–3 Months.	3–6 Months.	6–12 Months.
Syphilis - - -	60·9	26·2	12·9

There is no sort of doubt that the official returns enormously understate the true mortality from this cause. The significance of the rate is identical with that for wasting diseases, and the remarks already made under that head have to be considered as equally applying to syphilis.

PHYSICAL METHODS OF TREATING HEART DISEASE.

THE NAUHEIM BATH.

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ALTHOUGH the effects and influence of the Nauheim treatment are to a considerable extent discussed in the following pages, I am not content to confine myself to a consideration of the virtues of certain chemically peculiar waters, and the influence of the adaptations of Ling's movements, better known as the Schott exercises, on the action of the heart and circulation generally.

Valuable as these undoubtedly are, both independently and in association, my feeling is that to speak of the Nauheim treatment, as consisting solely of these measures, is taking too restricted a view of the potentialities of bath treatment. It gives too much the impression of finality. The supplementary items of active exercise, dietary, and drugs are in danger of suffering in their importance by the implication that they are not essential.

Practically, it is impossible for one to be independent of the other. Each is an integral part of treatment, and must receive due consideration with regard to the position it should occupy, the *rôle* it may be called upon to sustain, and the importance which should be ascribed to it.

The need for a special modification in diet will be more apparent in one case than another. The preference for passive over active exercise may need to be exhibited. Rest may be considered necessary for one, while another may immediately proceed with the routine treatment.

As a matter of fact, it is seldom possible to launch a patient on to the Nauheim treatment, as commonly understood, without some degree of preparation.

In dealing with individuals, it must be always borne in mind that there are factors at work, beyond the merely chemical and mechanical ones, which must be appreciated

which the most careful examination will fail to reveal, which are nevertheless of the highest importance, and which one can only estimate intuitively.

An attempt must be made to arrive at the entire mental attitude of the patient. I do not mean for one moment to say that such is not the case with any other method of treatment, but it is particularly necessary if hydrotherapeutic measures are to be employed successfully. Not only has the ability of his nervous and circulatory symptoms to respond to treatment to be gauged, but the degree of confidence with which it is undertaken.

The amenability to direction, the need of encouragement, or caution against undue haste, the intensity of apprehension, with which the morbid condition is regarded, the fear of failure to obtain relief, all act either as warning signals, or encouraging symptoms.

A remark in almost similar terms made to me several years ago by a prominent Spa physician, to which, at the moment, I paid very little attention, has since often recurred to my mind. He said: "One of the greatest difficulties you will have to meet is to acquire the habit of estimating the capacity for treatment possessed by your patients. It is a thing incapable of explanation, or definition, but on it will in a great measure depend your success."

It cannot be too frequently remembered that the circulation does not continue as the result only of the action of a system of elastic tubes connected with a force pump. It never flows for two minutes in the same manner. The blood supply to each organ is not mechanical, but regulated, from minute to minute, according to its needs and activities. The whole system is under the sway and guidance of mental processes none the less active, because they fail to rise into conscious perception. The conscious mind may, however, adversely affect these vegetative processes, and it is a recognition of this fact, which makes an appreciation of the patient's mental attitude of so much importance.

The value of the Nauheim treatment as a remedial agent cannot be disputed, but it is being relegated to its proper position therapeutically. It is no longer regarded as the treatment *par excellence* for all cardiac disorders, but only

of value where myo-cardial deficiency has occurred either with or without valvular incompetence. Its highest value is undoubtedly in those cases of simple dilatation, the result of prolonged and debilitating illness, such as typhoid fever, pneumonia, influenza, in some forms of Bright's disease, the condition of high arterial tension, without albuminuria, resulting from high living, overwork, worry, anxiety, the uric acid diathesis, and those cases of threatened valvular disease, which are sometimes seen towards the end of prolonged attacks of acute rheumatism, lastly, the general dilatation and hypertrophy consequent upon the persistent abuse of alcohol.

According to Dr. Beddard, this usually occurs in young men, with a tendency to fatty tissue formation, who have not only imbibed to excess for years, but have had prolonged physical exertion to undergo in addition. Young commercial travellers may be taken as a fair type of those liable to suffer in this manner.

The Bad Nauheim, as a medical agent, has been known for the past fifty years at least, though, at first, not so much in connection with the treatment of cardiac disease. The discovery of its uses in this respect was due to a Dr. Beneke of Marburg. It is of interest to note that no exercises were employed in association with the baths for the purpose of enhancing their effects. There is, however, no lack of testimony as to their capacity for "improving the muscular tone of the heart, and diminishing the intensity of the murmurs." It is not right to infer from this that a diminution in the intensity of a murmur is an invariable indication of improvement. On the contrary, it is not at all unusual to find an actual increase in the intensity of a murmur with a more forcible systole.

The fact of importance, and to which attention should be paid, is that the baths alone can give rise to improvement in the condition of the myo-cardium. I have frequently read, and heard it said by fellow practitioners in criticism of the Nauheim treatment, that while they have been inclined to believe that the Schott exercises might be attended with beneficial results, they have been very sceptical as to the value of the baths, and have almost ridiculed certain state-

ments and diagrams illustrating the improvement observed, set forth by some writers.

One of these sceptics, a retired colonel of the R.A.M.C., aged 57, was himself the subject of advanced mitral regurgitation. He could hardly walk across a room with comfort, was in a particularly restless and irritable condition of mind (always a serious symptom in heart trouble), cyanosed, dyspnœic, but, nevertheless, determined not to give way, but, in his own words, "die on his feet." I felt no hesitation in asking him to see what a course of baths would do for him, and with great difficulty at length persuaded him to take some. Before he entered the bath he noted his pulse rate and the limit of cardiac impulse.

After the first feeling of oppression, experienced by almost every patient on entering the bath, had passed off, his expression became more natural. The breathing was easier, the face less cyanosed. He volunteered the statement that he felt better, and drew attention to his more regular pulse and the improvement in the character of the apex beat.

At the end of the bath, which lasted ten minutes, he walked up a steep incline, though previously he had scarcely been able to move on the level with comfort, absolutely refusing to consider the question of resting or the use of a bath chair. He refused to go through a course of exercises, though he was advised to supplement the baths with them.

In spite of this auspicious commencement, however, the sequel was not a happy one. At the end of a week, he declined to continue taking the baths, as he thought them no longer necessary. I lost sight of him, but heard a month or two later of his death.

Here, then, was a case in which immediate and striking improvement resulted from the use of the bath alone, and which entirely traversed the criticisms of those who dispute its efficacy apart from the resisted movements. These exercises, the outcome of Dr. A. Schott's observations on the effects of Ling's Swedish exercises, and a modification of them for use in connection with the baths, have really been the means of attracting wider attention, of extending the knowledge, and increasing the reputation for usefulness, of the old Nauheim Baths. To such an extent has this been the case, that their

former fame for the treatment of nervous diseases, notably locomotor ataxy, is in danger of being forgotten.

It is entirely due to the statement of the Drs. Schott that baths, having identical effects with those of Nauheim, can be prepared artificially, that the treatment is obtainable in these islands at all. And it is with such artificially prepared baths that I have had to deal. That their effects may be sufficiently striking the case quoted clearly demonstrates.

The best brine to use, for the purpose of preparing the bath, is that from Nantwich, in quantities varying from $7\frac{1}{2}$ to 20 lbs. to the 30 gallon bath. This with the effervescent tablets are much more convenient than the bottles of acid, and carbonate of soda, first described by Dr. Bezley Thorne.

At any place, in which sea water is obtainable, the necessity for using brine is done away with. The bath is more rapidly prepared, is clearer, and free from all gritty particles.

Another advantage is that, by having the salt-water inlet near the bottom of the bath, the effect of the flowing sprudel can be closely imitated without diminishing the proportion of saline constituents. This is obviously impossible where only fresh water is available.

It is not advisable to add any calcium chloride to the bath. I have done so in cases in which I thought that prolonged cutaneous hyperæmia would be of advantage, but, though an improvement appeared to follow its use, I noticed that, even in very small additional quantities, rather severe cutaneous irritation and sometimes depilation was caused, succeeded later on by a more vigorous growth of hair. A condition of things not always desirable or commendable.

The material of which the bath is actually constructed is a matter of no small importance. Unless it is made of wood or porcelain, the acids used cause fairly rapid corrosion, with the result that a metal bath would soon require renovation.

The temperature of the baths at Nauheim varies from 95° F. to 82° F. These are the best temperatures to employ for the artificial baths during the summer months here, but, during the winter, I have found it most suitable to commence a course, with the temperature not lower than 98° F. In this case, the amount of carbonic acid gas to be liberated should also receive consideration, but this point will receive attention later on.

Before going further, it would be as well to pay some attention to the general effects of the application of water at different temperatures and under varying conditions to the surface of the body. For the sake of convenience these may be described under the qualifications of heat, moisture, chemical and mechanical effects.

It must be borne in mind that the surface temperature of the body is not that of the internal portions, and, normally, rarely exceeds 93° F. The temperature of the hands is more often than not lower than 88° F., while the internal temperature may for practical purposes be considered as 99° F. Immersion in a bath, with a temperature from 93° to 95° F., causes no change in either heat production or heat loss. This point is, therefore, spoken of as the point of thermal indifference, and the effects of a bath at that heat are athermal. At lower temperatures, although the baths cause loss of heat, there is an increase in heat production. Otherwise the whole body would sink to the same level of temperature.

Baths below 93° F. are, therefore, known as hypo-thermal baths. Baths, with a range of temperature between 93° and 98° F., are sub-thermal, while above 98° they are called thermal. Thermal waters produce an effect by checking heat loss; they do not, however, check heat production. The result is that the general temperature of the body is raised. Baths whose temperature is below (say 99° F.) blood heat, but not below 93° F., usually feel warm to the hands or surface of the body.

Baths having a temperature lower than that of the surface of the body cause a contraction of the peripheral blood vessels. There is a rise in blood pressure, a compensating increase in the cardiac systole, a filling of the blood vessels in internal organs, the pulse is first quickened, but shortly after, as the organism adjusts itself to altered conditions, and the heart gains strength, it is slowed perhaps 10 to 15 or 20 pulsations per minute. In baths whose temperature is below blood heat, but above that of the skin, the blood vessels of the surface dilate, there is a sensation of warmth, which soon passes off, and is succeeded by a feeling of chilliness, which is often disagreeably apparent on getting out of the bath. The bath is neither hot enough nor cold enough to act as a stimulant. This displeasing effect is neutralised in the Nauheim bath by the presence of the free

carbon dioxide. Taken for almost any length of time, their general effects may be described as sedative. It is by no means unusual to find a patient sleep soundly after such a bath.

The actions of heat and moisture are generally combined in baths. Moisture is sedative, the skin becomes softer, and its deeper layers swollen by imbibition. Heat either above, or below, the point of thermal indifference acts as a stimulant, and is stimulating in proportion to the degree above, or below, that point, at which it is employed, and in inverse proportion to the duration of its application. Thus a hot or cold bath, from being a stimulant may become a most powerful depressant. The colder, or hotter, a bath is, the shorter should be the period of its application, if a depressing effect is not desirable.

The action of the chemical constituents of the bath are due to the irritation of the nerve endings in the deeper layers of the corium. It is said that they are not absorbed into the circulation. Apart altogether from the difficulty which exists in determining whether such absorption does, or does not, take place. A difficulty of chemical analysis, I take it, rather than of inherent improbability. The following questions make a solution a matter of almost insuperable difficulty, if the power of absorption be denied.

If the saline constituents of a bath are absorbed sufficientiy to affect the nerve endings, how is it the peripheral vessels escape their influence, seeing that both terminate in the papillæ of the corium?

If the salts can get through the less permeable epidermis to the corium, what is to prevent it from travelling on to the subcutaneous connective tissue spaces, and thus through the lymph channels back into the general circulation.

How can the blood vessels differentiate between chloride of soda introduced into the lymph spaces from without, and that in the lymph spaces derived from the circulation?

It is admitted that poisons, both mineral and vegetable, can be introduced into the circulation through the unbroken skin, what is the reason for common salt being denied entry in a similar manner?

Again, as a matter of observation, I have repeatedly seen patients undergoing a course of sulphur baths, whose silver

ornaments have become almost black, although no sulphur, or compounds of sulphur have been administered by the mouth.

I think that it must be admitted that absorption of the saline constituents of a bath does take place, though to what extent they influence the patient is another question altogether. In the case of chloride of soda, this material exists already to such a large extent in the blood that the effects of an additional quantity may be regarded as practically nil. With regard to the gaseous constituents of the baths, there seems to be little doubt that they find their way into the circulation, if not through the skin, then through the ordinary channels of respiration. The presence of carbon dioxide seems to give characteristic properties to the baths. These properties are in accordance with the known physiological effects of the gas. A deficiency of oxygen in inspired air, and consequently in the circulating blood, leads to a stimulation of the respiratory centres in the medulla, which increases in proportion to the venosity of the blood. Deeper inspirations will result, with consequent aspiration of blood into the left ventricle. Where, as in the Nauheim bath, the gas is being given off at the rate of 1,500 c.c. per litre, it is obvious that the proportion of oxygen inhaled is diminished. It is only reasonable to suppose then that greater inspiratory efforts will result, and as a matter of fact this is so. That it has also an effect upon the circulation, Dr. Rose states that it raises arterial blood pressure, and improves both the rhythm and vigour of the pulse. Dr. Ewart has gone a step further than administering the gas in the form of a bath, by giving it as an inhalation for the relief of pain in angina pectoris and heart disease generally, apparently with satisfactory results too.

Baruch describes carbonic acid gas as the unrivalled stimulant to involuntary unstriped muscular fibre, and attributes a great many of the effects of the Nauheim bath to its action, in causing an increase in the power of the rhythmical contractions of the peripheral arterioles.

It may not be out of place here to note the effect of baths containing free carbonic acid gas in cases of locomotor ataxy, as recorded by Dr. Jean Heitz. He noted an improvement in both superficial and deep sensation. The plantar sense being

particularly improved. Analgesia disappeared along the course of several of the nerve trunks. The capacity for combining impressions with the sense of position became more accurate. The reflexes became more active. The ataxy was lessened. The general condition showed a change for the better. The provisional explanation is that the free carbonic acid gas produces a tonic effect on the myelin sheaths of the nerves, so that they act more effectually as an exciting medium for the axis cylinders, which are thus enabled to detect sensations more precisely.

The value of these observations will be more highly appreciated by those who prefer to attribute the influence of the baths to their effects on the nervous system, rather than to any direct action on the circulation.

The effects of the Nauheim baths have been likened to those obtained by sea bathing. The dashing of the waves and the invigorating movement of a large volume of water against the surface of the body is absent, it is true; yet the constant impact of fresh particles of water, owing to the brisk effervescence in progress, has been considered as distinctly analogous to it. Perhaps it is but the other prevailing conditions are so utterly unlike it that, to the ordinary mind, the analogy will seem somewhat distant.

Before leaving the subject of the effects of the carbonic acid gas, I should like to say that, with the lowering of the temperature of the bath, the proportion of gas should be increased. If the effect of lowering the temperature is considered for one moment, the reason for increasing the relative amount of the gas becomes apparent. With a cooler medium the capillaries dilate less, while the larger amount of gas ensures a compensating increase in the strength of the heart's contraction, and also in the contraction of the involuntary muscular fibres of the small blood vessels. No sense of chilliness is experienced, partly because of the effects of the gas, and also partly on account of the presence of calcium chloride. In short, there is a general toning up of the circulatory system arrived at, by such easy stages, that the increase in the amount of work performed is not perceived by the patient. The heart muscle has been improved by a course of gentle gymnastics, if such an expression is permissible. It is hardly necessary to

say that the transition from a sub-thermal to a hypo-thermal bath should be made with great caution.

When it is remembered that the cutaneous vessels alone can contain nearly one-third of the entire blood of the body ; that these all undergo dilatation as the result of immersion in a bath at blood heat ; that the internal organs are consequently less well filled, it will be readily seen that a sudden alteration of these conditions might be attended with disastrous results, especially where the heart wall was very much thinned. No doubt this depletion of the viscera by determination of blood to the surface is a very important factor in enabling a dilated heart to regain its tone. It is quite conceivable that the effect would be immediately noticeable both by the patient and by an observer.

According to Schott, the effects of the bath are due, partly to the excitation caused by the mineral and gaseous constituents, and partly by the prolonged stimulation of the sensory nerves by imbibition. Each nerve of sensation transmits to its centre an influence, which is reflected from it to the vasomotor system, and to the ganglia, which control the heart's action. This explanation is hardly adequate. In addition to the relief of the circulation, which must ensue as a consequence of the dilatation of the cutaneous vessels, to which Sir W. Broadbent attaches great value, other influences must be at work. Notable amongst them must be the relief occasioned by the floating upwards of the heavy abdominal organs, the liver, spleen, stomach, and intestines with the consequent removal of all downward tension on the large abdominal blood vessels, which must follow total immersion. In fat people, with flabby, pendulous abdomens, the mere act of reclining must afford considerable relief. How much greater must be the alleviation when practically the entire weight of the viscera is removed. The idea was suggested to me by a medical friend's defence of the feather bed. He pointed out that, whereas a thin man could lie with comfort on almost any sort of mattress, a fat man on a hard one would be rendered uncomfortable, not only by the hardness of the couch, but by his liability to "spread" from want of support. Whereas, lying on a billowy feather bed, he would sink into it, and the weight of the abdominal viscera, partly sustained

by the displaced feathers, would cause him to feel at ease and rested, when he awoke in the morning.

Following the baths, there is a feeling of warmth, a diminution in the frequency of the pulse rate, increased excretion of urine, redness of the skin, with an increase in the activity of the sweat glands. According to Winternitz, these results are due to the carbonic acid gas.

With regard to the administration of the baths they should not be given on consecutive days, but at an interval of at least a day between each bath. It is important that the bath should not be taken closely following a meal.

The patient should recline quietly in the bath, not moving about more than is necessary. The bubbles of gas should be allowed to collect on the skin, and removed, only two or three times in the course of the bath, by passing the hand gently over the surface of the body. On getting out of the bath, the patient should not be allowed to rub himself nor be rubbed dry, but a soft dry towel should be applied to the skin without unnecessary friction.

Dressing should be performed slowly, without fuss or exertion. It is better for a patient to wear easy slippers than lace or button boots, and to wear soft rather than starched shirts.

The contra-indications of the bath are said to be the presence of albuminuria, eczema, hepatic dyspepsia, œdema, peripheral neuritis, and angina pectoris. With regard to these, speaking from my own observations, I have never seen ill results follow the use of the baths in cases in which the albuminuria was due to cardiac inefficiency. Nor have I seen ill results in cases of chronic interstitial nephritis with consecutive heart trouble, but I once saw a patient suffering from large white kidney very adversely affected. As soon as he got into the bath, vomiting commenced, and would continue the whole time he was in it. He was anxious to see what the baths would do for his heart, and took three, in spite of his initial experience, but, as the same result invariably followed, he at length desisted. As the vomiting occurred when the stomach was empty, the fact that that organ was slightly dilated did not seem sufficient explanation. Moreover, he merely brought up a frothy mucus.

It is, I know, not satisfactory to state bald facts, and to make no attempt at elucidation, but, if only facts were recorded, the explanations of which were easily deducible, the need for observation would soon cease to exist.

I presume that reasons have been advanced for the various contra-indications cited, otherwise they would not have been enumerated, but I have never seen any for cases of this nature. The untoward results, observed in the present instance, are, I think, sufficient justification for quoting the case as an example.

It seems to me hardly fair to give a list of contra-indications for a certain treatment without some fact also being stated in support of the assertion. It savours, if I may use the term, somewhat of empiricism.

Ordinarily speaking, it should not be regarded as empirical to prescribe a treatment which had been proved of service in a certain class of case. The mere fact that it had been of service would render the prescription rational. The same may also be advanced with regard to contra-indications. Just as much caution is necessary in deciding against a line of treatment as for it. I have, on occasion, been greatly puzzled by recommendations for baths which I have seen. One particularly, in which brine baths were recommended for a patient convalescent from an operation for malignant tumour. Generally speaking, bath treatment is the last that should be adopted in any case of malignant disease. Non-malignant tumours may, and frequently do, yield to hydro-therapeutic measures, not so malignant growths.

I have often been astonished at the manner in which people, obviously ill, have prescribed baths for themselves.

I once saw a patient, suffering from a large osteo-sarcoma, embark on a course of baths. He rapidly got worse, the size of the tumour increasing remarkably, when he abandoned his "treatment."

Another case, illustrative of ill results following the Nauheim bath when a condition contra-indicative of the treatment was in evidence, was that of a lady, a victim to eczema. She was about 58 years age, and had suffered from eczema on the palmar surface of the right wrist for a great number of years. She was also liable to attacks of pain which she located in the liver. She had had Herpes Zoster on the

right side some years previously. She commenced a course of Nauheim baths, and, after the first bath, felt very much fatigued. The following day she noticed that the eczema had almost disappeared. She took another bath on the succeeding day, and 24 hours afterwards the eczema had vanished, but she complained of great pain in the stomach. For breakfast that morning she had eaten devilled kidneys. About one o'clock she commenced to vomit, and in a short time was in a critical condition, vomiting incessantly, and at last bringing up blood. For weeks she remained unable to partake of solid food, and, for several days, was fed per rectum. Pain remained persistently over the pylorus, and through the abdominal wall a thickening could be felt, highly suggestive of malignancy. After a time her condition improved, and, with the return of her usual health, the eczema gradually reappeared in its former position, where it has remained for the past six years.

What relationship the bath had to the disappearance of the eczema is a problem which I do not feel competent to solve. I imagine that the first bath coincided with a temporary improvement in its condition, and that its subsequent disappearance was dependent upon suggestion. No one else who partook of the dish of kidneys was in any way affected. I have not read of any constitutional disturbance resulting from the use of the baths in patients, who have been similarly affected by eczema, and think that its local effects have been held as sufficient contra-indication. I have always made a rule of covering eczematous patches with vaseline, or collodion, before allowing the patient to enter the bath.

In aortic regurgitation I see no reason why, if the myocardium is degenerating, the baths should not be employed with as great benefit, as in other valvular troubles in which the incompetent valve may then be regarded as an incident. Of course this is making an extreme statement, but my meaning is, I think, sufficiently clear. Where there is no evidence of commencing dilatation, but good compensatory hypertrophy is present, I should be inclined to think that the employment of baths, or of any measures tending to alter blood distribution, would be unjustifiable, as their tendency would be to alter the state of equilibrium, and perhaps do harm.

In angina pectoris, so much depends upon the cause of the

angina that I should hesitate to withhold the bath, merely because anginal symptoms were prominent. I certainly think that alterations of temperature should be made with great care. Too cool a bath would certainly be conducive to an attack of angina, especially if occurring as the result of stretching of the muscular fibres of the heart in the effort to overcome peripheral resistance.

In considering the probable influence of baths in cases of angina pectoris, it may not be out of place to say here that, for many years, I have been convinced that the so-called bather's cramp is, in all probability, due to an acute attack of angina pectoris, induced by entering the water in a physically unfit condition, or by remaining in it for too long a time.

From what has already been said, the mechanism is so obvious that further explanation is unnecessary. I think it unreasonable to imagine an expert swimmer incapacitated by cramp in the foot, arm, or leg, to such an extent that he would be unable even to float until assistance arrived. Cramp in the abdominal muscles is an improbable cause of drowning, as the buoyancy of the water would ease a great deal of any strain that would otherwise be thrown upon them. Cramp does not ordinarily occur in young healthy subjects, except in muscles in a state of unusual or extreme contraction. The opposing muscles can, as a rule, be effectually brought into play. If the abdominal muscles were cramped, the descriptions of those who have witnessed such drowning fatalities must surely be incorrect; the unfortunate bather is so frequently said to have "thrown *up* his hands and disappeared." With a cramped abdomen, I believe this would be a physical impossibility. Angina, on the other hand, would cause immediately an awful fear of impending dissolution. An agonised scream and impotent clutching at the air in a vain search for support, before unconsciousness supervened, would occur just as much in the open river, or sea, as it does on dry land. I have met many people who have suffered from cramp in the arms or legs while bathing, but not one who has had cramp in the abdomen.

HOLIDAY ACCIDENTS.

A sad double drowning fatality occurred near Frodsham, Cheshire, on Saturday afternoon. Two Runcorn youths, named Reginald Booth and William Williams, were bathing in the

River Weare, when the latter was seized with cramp. Booth gallantly went to his companion's assistance, but was dragged under, and both lads were drowned.

A number of boys were bathing in the River Wye, near Dinedor Tunnel, Hereford, on Saturday night, when two of the younger ones got into difficulties. Albert Ernest Davies, aged 10, the son of a farmer, displayed great heroism. After considerable trouble he rescued both, and had just got them to land when he fell back into the water from exhaustion or cramp, and was drowned.

Mr. Peter Self, an undergraduate of St. David's College, Lampeter, was drowned on Saturday afternoon in a pool in the River Teifi. After playing in a tennis tournament, Mr. Self cycled to the river and had a bath. Some boys who noticed his disappearance gave the alarm. His body was recovered after some time, but all attempts to restore animation failed. The body was conveyed to the college, the undergraduates following with bared heads.

In the accounts of the bathing accidents here recorded, which have been cut at random from newspapers, the chief characteristic is the sudden and absolute helplessness of the victim. This alone should make one very chary of accepting a diagnosis of cramp as ordinarily understood. In the case of Peter Self, the conditions were particularly favourable to an attack of angina. A hard game of tennis, followed by a bicycle ride, a plunge into a deep pool of spring water, while all the surface vessels were flushed and full of blood; a complete contraction of them, consequent on the sudden immersion in cold water, one or two gasps to aspirate the blood into the thorax, in an automatic endeavour to compensate for the sudden increase of pressure in the other vessels, failure of the fatigued heart to accomplish the work thus thrown suddenly upon it, and so an end. The water closed silently over another victim of "bather's cramp." The sequence of events having been so rapid that the first intimation which onlookers received of the occurrence of a tragedy was the absence of the bather.

Angina pectoris, dependent upon atheroma of the coronary artery, should not alone contra-indicate baths, if there is any rationality in ordering them for their known physiological

effects, but, where there is reason to believe that an aneurysmal dilatation exists, then anything tending to increase the force of the cardiac systole should be avoided. Moreover, though the blood pressure may be lowered during the course of the baths, and for a short time afterwards, alterations in the calibre of the vessels would not be conducive to the formation and consolidation of a clot, while the increase in the strength of the cardiac systole would constitute an element of danger. Another point, which one must consider in this connection, is that a certain degree of vascular tension is essential for the proper carrying on of the circulation, because the amount of blood in the body is strictly limited. If the blood pressure in the systemic vessels falls, it does not by any means follow that the pressure in the pulmonary vessels falls also. Indeed, it is only reasonable to anticipate a contrary effect. Pic and Petitjean have recently shown that, on the administration of nitrite of amyl, a fall in the blood-pressure took place in the systemic vessels of a curarised dog, while the pressure in the pulmonary artery rose. If the anginal attacks, therefore, are due to dilatation of the right ventricle, are associated with so-called cardiac asthma, or with neuralgic pains in the right arm, I should consider the Nauheim baths to be contra-indicated.

In any given case of angina pectoris, if I felt doubtful of the cause of the attacks, I should discountenance the use of the bath.

With regard to its use in œdematous conditions, although œdema has been given as a contra-indication for its employment, I must confess to having ordered the bath frequently, when both œdema and moderate ascites have been present, and have never observed the slightest ill-effects. The presence of the calcium chloride should be a reason for administering the bath in œdematous conditions rather than otherwise. The effect of calcium chloride is to reduce the amount of fluid exudation and to promote absorption. In the absence of this salt, and in the presence of sodium chloride, œdema would certainly be a reason for withholding the bath as NaCl prevents the removal of exudations.

The explanation may be, that absorption, through the skin, of a fluid containing a much higher percentage of salt

in solution than the blood plasma does, causes that fluid to pass out of vessels, and also possibly out of the blood cells, into the connective tissue spaces by osmosis, and that possibly a condition results in the living body very similar to that which has been observed in the occurrence of the phenomenon, known as plasmolysis. This explanation presupposes the absorption of sodium chloride by the skin, and, I am aware, may, therefore, be held as incorrect.

Both Sir Philip Smyly and Sir Francis Cruise have borne testimony at different times to the efficacy of the Nauheim bath in heart disease associated with dropsy. I do, however, believe that, in cases in which ascites is present to a considerable extent, the use of the bath is not unattended by risk.

In conclusion, the effects of the Nauheim baths may be briefly summarised as follows :—

1. A general dilatation of the capillaries and smaller blood vessels of the surface, with consequent relief to ventricular contraction.

2. A slowing of the pulse with more complete emptying of the ventricles.

3. An increase in the tone of the capillaries, with probable increase in the force of their rhythmical contractions, causing additional volume and rate of the distal circulation.

4. A floating upwards of the heavy abdominal viscera by hydrostatic pressure.

5. A reflex nervous effect on the cardiac ganglia, whereby the ventricular power is increased and regulated.

6. The action of the skin and kidneys is also increased.

7. Certain beneficial trophic effects, in cases of anæmia, neurasthenia, osteo-arthritis, diseases of the spinal cord, and some cases of peripheral paralysis.

A REVIEW AND STUDY OF SOME RECENT LITERATURE UPON ARTHRITIS.

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Since the last review of the subject of arthritis in The Practitioner for June 1904, there has been a great deal of activity in both the pathology and treatment of these affections.

First with regard to pathology, the ætiology of acute rheumatism still occupies attention. On the whole, it must be conceded that the view that it is the result of an infection has gained much ground, and there are fewer now who believe that this infective agent is still unknown. The particular point in dispute is the old one as to whether the infection is a special one, or whether it is an attenuated form of some other infection.

Frissell: "The Ætiology of Acute Rheumatism." *Med. Record*, May 12, 1906.

The author here discusses, at some length, the investigations that bear upon the infective nature of this disorder, and records his own results. In seven cases, the arthritic exudations were aspirated in from 24 to 72 hours after the commencement of the arthritis; but in every case the bacteriological results were negative.

He also investigated three cases of erythema nodosum by raising blisters over the nodes and making investigations from the fluid; these results were also negative.

The author then had recourse to cultivations from the throat, a method which Paine and Poynton originally demonstrated might be successful, and which was also used by Meyer as the basis of his well-known investigations upon acute rheumatism. Frissell by this method isolated an organism which he describes as follows:—

"(1) Culturally, it possesses no features by means of which it may be readily distinguished from other diplo- or

streptococci. (2) It possesses special affinity for joints, as a rule attacking several successively, and in a less degree other serous membranes. This is shown by the fact that ten out of the eleven rabbits injected had a polyarthritis, the other dying of pericarditis and pleurisy after a two weeks' illness. (3) That it sometimes produces pus in the joint with disintegration of the joint itself. In all the animals of the first series, the joint fluid was somewhat turbid and rich in cellular elements, particularly in leucocytes. This was more marked than in any fluid obtained from the joints of a case of rheumatism in man. In the second series, the fluid contained fewer cellular elements and was comparatively clear. (4) That though occasionally producing pus in the joints, none was found elsewhere in the body, a remarkable fact when we consider that the organism is an ordinary pus producer. The natural result of the injection of such an organism into the circulation would be a pyæmia, with miliary abscesses throughout the body. (5) That in a majority of cases, the course of the disease caused is toward spontaneous cure. (6) The dose was proportionately much greater than one would expect to gain entrance to the human body at any one time, and consequently the more serious results, such as joint disintegration, may possibly be attributed to an invasion of the articular tissues by an overwhelming number of cocci. (Five c.c. were commonly injected into a 3 to 5 lb. rabbit. A corresponding dose for a 150 lb. man would be 150 to 250 c.c., given directly into the blood stream, a condition which would practically never obtain.)"

Frissell does not commit himself as to the specificity, or otherwise, of this micro-organism. As so many workers upon this subject have done, he lays much stress upon the production of pus in some of the joints, in which arthritis has been produced by experimental inoculation, and drifts into the somewhat barren conclusion that acute rheumatism is a form of pyæmia ; the causal agent being an attenuated pus coccus.

This investigation supplies further evidence that there is present in acute rheumatism a diplococcus which can produce in animals lesions that resemble the human lesions. It does not, however, elucidate the pathology of acute rheumatism to any considerable degree, because cultures taken from the

throat are unsatisfactory. The writer is inclined to differentiate this diplococcus from that described by Poynton and Paine, because of the occasional occurrence of pus in the experimental arthritis. Poynton and Paine, however, frequently described the arthritis exudation as containing many leucocytes, and pointed out that films, from severe rheumatic pericarditis in man, might be indistinguishable under the microscope from a film of pus.

There can be no real support for a view which looks for the criterion of rheumatism as the presence or absence of pus, for if it is once allowed that a diplococcus, or streptococcus, is the cause of the disease, all experience of this group of organisms points to all of them producing, in some circumstances, a pusiform fluid. The clinical history of acute rheumatism is a sufficient evidence that the disease is not an attenuated type of some other infection, for acute rheumatism may be, and frequently is, most virulent.

RUFUS COLE, *Journal of Infectious Diseases*, Vol. I., No. 4, November 1904.

This author contributes a valuable paper upon the subject of streptococcus arthritis, under the title of "Experimental Streptococcus Arthritis in relation of the Ætiology of Acute Articular Rheumatism."

Cole, for three years at the Johns Hopkins Hospital, investigated the blood and synovial exudations in cases of acute rheumatism, with negative results, thus confirming the experience of Philipp, to which I alluded in the review in THE PRACTITIONER of June 1904. In this paper, he discusses the recent investigations upon acute rheumatism, which have already been fully dealt with in THE PRACTITIONER in 1902, 1903, and June 1904, and then proceeds to detail some very careful experiments with various strains of streptococci isolated from cases which he claims are certainly not rheumatic in nature. The animals used were rabbits, and he summarises his results in these conclusions:—

"Arthritis and Endocarditis may be produced by the intravenous inoculation of rabbits with streptococci from various sources, and the results are quite similar to those described as resulting from the inoculation of the so-called 'micrococcus,' or diplococcus rheumaticus."

"Therefore the description of a distinct variety, or species, of streptococci based on this property of causing endocarditis and arthritis is unwarranted." Whether the evidence is sufficient to show that acute rheumatic fever is simply a form of streptococcus septicæmia he does not discuss.

This paper of Cole's is a valuable contribution to the subject of the causation of acute rheumatism, because it brings us face to face with a method of argument, which all, who are really intent upon the solution of the cause of acute rheumatism, must either accept or reject.

Cole, it will be observed, isolated a micrococcus from diseases, which he admits are not rheumatic, and, from his experimental results, maintains that the lesions, that he has produced in animals, are "quite similar" to those produced by other investigators with a micrococcus, isolated from definite rheumatic lesions *in man*. He naturally goes further, and holds that the production of arthritis and endocarditis, by a micrococcus, does not warrant the statement that such a micro-organism is specific. We are not surprised, therefore, to find, in the writings of some Americans upon the cause of acute rheumatism since this work of Cole's, the statement that the English researches upon rheumatism are practically of no avail in establishing the cause of the disease. Yet this is quite illogical, and, if once admitted, reduces the subject once more to a state of chaos. The fallacies are these :— We know that in man and animals there are causes of arthritis and endocarditis, which all admit are not rheumatic, and no one, producing an arthritis and endocarditis in animals with a micrococcus, can, for this reason, go further than state the bare fact that it was able to produce these results, they cannot argue from the result as to the specificity or against the specificity. Secondly, in elucidating the bacteriology of a disease, we cannot ignore Koch's first two postulates :

(1) The bacterium must be present in the lesions of the *disease in man ;*

(2) And must be isolated from these lesions in pure culture.

The investigations, in this country, cannot then be dismissed in a summary fashion, for they state the following facts :—

That a micrococcus, which is present in all the important rheumatic lesions, can be isolated in pure culture from them, and will produce similar lesions in animals, from which, in turn, they may be isolated in pure culture, and will produce similar lesion in animals, from which, in turn, they may be isolated in pure culture. Further, of all infections, none in man is so liable to cause arthritis and endocarditis as the rheumatic infection, and English investigators have shown that no micro-organism is so liable to cause these lesions in animals, a fact, which they claim, supports the causal relation of this infection to rheumatism.

Lastly, it must be added that when writers state that acute rheumatism is simply a form of streptococcus septicæmia, they are stating something which is very far from simple; for rheumatism is a very peculiar and remarkable disease, and the streptococcus poisons are very complex and little understood.

EXPERIMENTAL WORK IN RELATION TO THE MICROCOCCUS RHEUMATICUS AND STREPTOCOCCUS PYOGENES.

J. M. BEATTIE: *The Journal of Medical Research*, January, 1906.

Beattie, whose work upon chorea has been already alluded to in a previous review in THE PRACTITIONER (1904), strongly defends in this paper the specificity of the micrococcus rheumatic us. He records a case of fatal rheumatism, in which he isolated the micrococcus, and with which he obtained the usual experimental results.

It is of special interest that he isolated the organism from an inflamed knee joint. The fluid from this joint was *sterile*, but pieces of the inflamed synovial membrane gave a pure growth of the micrococcus. This result bears out the fact that the micrococci are situated in the synovial tissues, and are not, as a rule, found in the arthritic fluid, which is, as a rule, sterile.

Beattie points out that the experimental results with the streptococcus pyogenes differ much from these with the micrococcus rheumatic us, in that endocarditis and arthritis are rare, and rapid septicæmia is common, and he opposes the statements of Harris and Cole that the experimental

results they obtained with streptococci, derived from non-rheumatic cases, are exactly similar to those produced by himself with the micrococcus of rheumatism. He obtained the following results with Marmorek's reaction :—

Filtrate from streptococcus pyogenes + streptococcus pyogenes gave no growth.

Filtrate from streptococcus pyogenes + micrococcus rheumaticus ; copious growth.

Filtrate from micrococcus rheumaticus + micrococcus rheumaticus ; feeble growth.

Filtrate from micrococcus rheumaticus + streptococcus pyogenes ; moderate growth.

He summarises his conclusions thus :—

1. The results obtained by injections of streptococci are different from those produced by the micrococcus rheumaticus.
2. The micrococcus rheumaticus cannot be regarded as producing an attenuated streptococcus pyæmia.
3. In uncomplicated cases of acute rheumatism, the organism is not usually found in the blood, or in the joint exudate.

In the *Lancet*, December 16, 1905, Poynton and Paine continue their investigations upon acute rheumatism in a paper entitled "Some Investigations on the Nervous Manifestations of Acute Rheumatism." They defend their former statements, and bring forward some further points connected with chorea and meningitis in the rheumatic. They record two cases of fatal chorea, in which death occurred from acute pericarditis. In both of these they demonstrated the "diplococcus rheumaticus" in the perivascular spaces of the cerebral pia mater. In one of them, cultures from the cerebro-spinal fluid showed a pure growth of the diplococcus which produced, on intravenous injection into rabbits, arthritis and pericarditis. Plates from the original preparations, shown before the Neurological Society of Great Britain, are given in the paper, showing the relation of the micrococci to the blood capillaries. A remarkable case of meningitis is recorded. The patient, a boy of 13, suffered from a definite, but not very acute, attack of rheumatic fever, which reacted admirably to treatment. Convalescence was uninterrupted for nearly three weeks, and

then suddenly, without apparent cause, headache, vomiting, and fever developed. The boy very rapidly went from bad to worse, became unconscious, with a temperature of 106·4 in the rectum, and 102·4 in the groin, and died.

The necropsy showed a healing mitral lesion, a small patch of pleurisy; no focus of suppuration anywhere, but a cerebral and spinal meningitis fibrino-plastic in type. The cerebral meningitis was basal in type. A diplococcus was demonstrated in great numbers in both cerebral and spinal membranes, and, with large doses, produced in rabbits rapid death, with severe cerebral symptoms, and in small doses, a mild arthritis. The authors discuss the nature of this meningitis, and incline to the view that it was of rheumatic origin. They also discuss the pathology of chorea, and allude to the most recent investigations which have been made in this direction.

HYPERTROPHIC PULMONARY OSTEO-ARTHROPATHY.

Hypertrophic Pulmonary Osteo-Arthropathy is the subject of a valuable communication to the *Transactions of the Royal Medical and Chirurgical Society*, 1904, by H. E. Symes-Thompson. The paper is based upon a study of 82 cases, 12 of which had come under the notice of the author. There are three plates illustrating the bony changes which occur in the disease.

The condition is so rare that it may be of service to give a brief analysis of the symptoms, which Symes-Thompson, in his study of these cases, has described.

The condition is more common in males than in females, and occurs usually in middle life. The patient is suffering from some suppurative disease, usually in the thorax, from congenital heart disease, or from syphilis. The first evidence is clubbing of the fingers and toes, then follow the bony and arthritic changes. The nails are large, broad, brittle, and incurved. The onset is insidious, and its true relation to the primary lesion differs very appreciably. Thus, it may arise synchronously, but frequently, from six months to a year, may elapse before the arthropathy commences, and its appearance may even be delayed for years.

The commonest early symptoms are stiffness of the wrists

and ankles. Three or four months later, the swelling shows itself, and there may be pain, or, what is more usual, discomfort. Physical examination shows stiffness and some effusion. The metacarpo-phalangeal joints may be involved, especially those of the thumb and first finger. The end of the bones of the forearms and legs, the metacarpal and metatarsal bones and the phalanges are noticed to be enlarged and sometimes tender.

Thompson recognises two groups of cases :—

(1) The arthropathic, in which the arthritic symptoms are prominent. These arthritic swellings appear and disappear in a mysterious manner.

(2) The osteopathic, in which tenderness of the bones is the chief feature.

Thayer has found actual lengthening of the bones in this disease.

As the condition becomes more chronic, the muscles in the neighbourhood waste, and, eventually, the patient may be carried off by the primary disease. In other cases, there may be improvement, with the abatement of the primary cause.

The post-mortem facts are interesting.

In 18 out of 21 cases a pulmonary lesion was demonstrated. The bony changes are the result of periostitis, and, in some cases, the cancellous bones are sclerosed. In one case, a chemical examination of the bone showed a marked increase in the magnesium phosphate at the expense of the calcium salts.

The joints, as a rule, show some erosion of the cartilages, but the remainder of the cartilage does not lose its polish. The clubbed fingers are to a great extent the result of changes in the soft parts.

The author discusses the probable cause of hypertrophic pulmonary osteo-arthropathy, and his conclusions are as follows :—The condition is probably a result of poisonous bodies circulating in the blood. These toxins may be volatile or non-volatile. The volatile are eliminated by the lungs, the non-volatile by the liver. If these organs are diseased this elimination is interfered with, and Thompson believes that there is, in hypertrophic pulmonary osteo-

arthropathy, a toxic focus somewhere in the body, often, but not necessarily always, in the lungs, together with a condition of lung which interferes with the elimination of the volatile toxins from this focus.

The diagnosis is not as a rule difficult. Acromegaly, for which it may be confused, is a primary disease in itself, and its nervous symptoms and visual changes are absent in the arthropathy. In acromegaly there are thickening of the skin and facial changes. The genital organs also are affected. The finger ends are square, and the bones of the hands and feet show general enlargement. These points usually serve for the recognition of this disease. Some chronic arthritic lesions of the rheumatoid type occasionally resemble the arthropathy, but the primary illness, from which the patient is suffering, together with the distribution of the arthritic lesions, usually serves to differentiate hypertrophic pulmonary osteo-arthropathy.

PARKES WEBER: *The British Journal of Children's Diseases*, May, 1905.

The author here contributes two more cases to the literature of the arthritic condition in childhood, described by Still in 1896. This condition has since been widely known as Still's disease, though it is doubtful whether the original title given by him of "A form of chronic joint disease in children" is not a better one, until their exact nature is decided. The peculiarity of these cases is their severity, chronicity, and their association with enlargement of the lymphatic glands and spleen.

Weber's two cases are of interest for several reasons. They did not, for instance, run a steady downhill course, but, under treatment, one improved greatly, and the other, never severe, remained stationary. His first case also showed valvular disease, an unusual accompaniment.

He attaches importance to the hypothesis that, in at least some cases, the condition is tubercular, and believes it to be very possible that the cause of the arthritic lesions is a tubercular toxin, circulating in the blood, rather than the deposition of tubercle bacilli in the synovial membranes.

His second case gave a positive reaction to tuberculin,

which showed that there was somewhere in the body, a tubercular focus, but did not prove that the arthritis was tubercular.

Weber doubts the need for the presence of concomitant enlargement of the spleen and lymphatic glands as an essential in the diagnosis of this condition.

I have seen a considerable number of arthritic cases in childhood resembling, in some but not in all respects, those described by Still, and have found that the glands may be enlarged, and yet the spleen not detectably so. In two of my cases, there was valvular disease, and in one this was very severe. My experience coincides with Weber's that these cases vary in severity and that some slowly improve. Weber, while admitting as probable that some are tubercular, believes others to be rheumatic. In my own series of cases, it is certainly very difficult to draw the line of demarcation, and some of them appeared to be cases of arthritic rheumatism in childhood aggravated by damp surroundings. I am convinced that they are not all tubercular.

BEVERIDGE: "Arthritis in Acute Dysentery." *Journal, Royal Army Medical Corps*, December, 1905.

It is a well-known fact that many soldiers in the recent South African war suffered from arthritis after dysentery. This makes the paper by Beveridge of particular interest. In about 3 per cent. of the cases under his observation (147), when the urgent dysenteric symptoms were over, and the temperature had practically reached normal, there occurred, in these cases, a sudden rise of temperature followed by a rapid effusion into various large joints, notably the knees, ankles, and elbows. The arthritis was exceedingly painful, but the inflammation not very acute, and recovery usually occurred in from 8 to 12 days. The temperature was irregular and septic in type, and, at the outset, there was frequently a slight rigor. After the attack was over, the joint was left stiff for a while on movement, but the arthritis did not relapse.

The writer then gives an example of a typical case, from which he succeeded in isolating a micrococcus from the blood. This micrococcus he obtained in 4 out of 5 cases, whilst, in

cases of dysentery uncomplicated by arthritis, he invariably failed to obtain a culture.

None of the cases were the result of a gonorrhœal infection. Beveridge alludes to the work of Lessage, upon the blood and fæces in dysentery, and to that of Durham and Mott on asylum dysentery, and suggests that the arthritis was due to secondary infection by the micrococcus, which had made its way from the intestine, the resistance of which had been lowered by the dysentery.

NATHAN-LAMIR, *Archives Générales de Méd.*, February 28, 1905, records a case of pneumococcus arthritis in a new-born child.

This infant, three days after birth, was operated upon for hare-lip, but the wound suppurated and, as a result, the health failed. Twelve days after the wound had been noticed to be taking an unfavourable course, the right shoulder began to swell, and acute purulent arthritis developed. The child died, and although no pneumonia was discovered, cultures proved the infection to be due to the pneumococcus.

Of the 31 cases of pneumococcus arthritis reviewed by Cave, only two occurred in childhood, and the respective ages were 5 and 8 years. Nathan-Lamir believes this case to be unique.

PAPERS BEARING UPON THE TREATMENT OF ARTHRITIS.

W. SOLTAU FENWICK and J. PORTER PARKINSON, *Royal Medical and Chirurgical Society*, April 1906, report some remarkable results from the use of an antistreptococcus serum in gonorrhœal affections, and in certain cases of purpura-hæmorrhagica.

In each of the gonorrhœal affections, the diagnosis was confirmed by bacteriological examination. The serum that was used was a polyvalent one, manufactured by Messrs. Burroughs and Wellcome from forty-three different strains of streptococci. This serum was injected rectally, and, except in the most severe cases, 20 c.c. were given first, and then 10 c.c. for the next three or four days. In the worst cases two injections were given in the day.

The writers detail five very striking examples of gonorrhœal

infection, which apparently only yielded to treatment when the serum was employed.

The favourable symptoms showed themselves about the third day of the new treatment, and improvement in each case was practically uninterrupted.

Two cases of severe purpura were also treated in the same way, and one of these, an adult, was almost *in extremis* when recourse was had to the injections. In these cases also improvement was rapidly shown. No abnormal symptoms ensued from the use of the serum, and no eruptions. The beneficial effect is found within three days. The writers advance no theories to explain the success of this method, and admit that the number of cases was small. The results were however, most encouraging.

They remark in this paper that Dr. Dowson, the Director of the Wellcome Laboratories, had discovered that the gonococcus grew well in a medium to which an anti-gonococcus serum had been added, but failed to grow in the presence of the antistreptococcus serum.

HOWARD MARSH, *Clin. Soc. Transactions*, 1905, describes a case of arthritis of which he believes the cause to be malaria.

A man, aged 38, received a kick on the knee from a horse, and for three weeks afterwards suffered very great pain in the joint, although there were no subjective signs. Two months later the pain became more intense, and the knee joint began to swell. Nine months after the accident the joint appeared natural, but there was much muscular wasting, and, when Marsh saw the patient, he was still suffering such extreme pain that he would have willingly submitted to an amputation. It was then discovered that every evening the joint became swollen from what appeared to be a vascular turgescence of the synovial membrane. This daily change suggested ague, and, on enquiry, it transpired that the patient had suffered from malaria when abroad. Ten grains of quinine were prescribed twice a day, with the result that the pain disappeared, the limb recovered strength, and the patient improved rapidly in his general health.

The writer brings this case forward tentatively, and lays stress upon the remarkable results that followed the free

use of quinine. Although the later history suggested a possible syphilitic taint, as well as the malarial, the success of the quinine was repeated in a relapse.

In the same volume, Howard Marsh describes *three cases of intermittent hydrops of the joints.*

A feature of all these three cases was the remarkable periodicity with which the effusions returned. In one case, the recurrence was every 14 days; in another, about the same time; and, in the third, every twelfth day; between whiles the joints, except for some weakness, were apparently normal. In all these cases, it was only an exudation into the articular cavity, and apparently a mere increase in the synovial fluid.

Other cases of this curious condition have been recorded, and were collected, in 1901, by Brackell and Cotton, and it appears from the literature of the subject that this affection may last for some years (three or four). The attacks may be regular or irregular, and disappear in the most mysterious manner. Sometimes the disappearance is permanent, in other cases it reappears after a considerable interval. Their pathology is obscure. Marsh has found arsenic of some value in treatment.

AXEL WINKLER: *Zeit. für diät. und phys. Therapie,* 1905, gives his experiences of the value of mud baths as used at Nenndorf, in arthritic affections.

The baths are of three consistences, viz., 1·2, 1·5 and 1·8 specific gravity. The medium and maximum are the most used. The temperatures, at which they are given, vary between 33° and 42° C. These baths are given, as a rule, every fourth day, and the usual course is 15. Before bathing, the patient should eat something, and the duration of a bath varies from 15 to 50 minutes. Cold applications are made to the head during immersion, and, after it is over, a cleansing hot-water bath is given, and the patient usually rests quietly on a couch.

Good results are obtained in fleeting muscular pains, and in arthritis, the result of acute articular rheumatism. In arthritis deformans less success is obtained. Gouty patients derive benefit, and the baths are of value in sciatica and neuralgia, and in pelvic inflammations. In such skin dis-

orders as weeping eczema and psoriasis great relief may be obtained.

As contra-indications, Winckler mentions acute cardiac diseases, advanced arterio-sclerosis, chronic renal disease, old age, pregnancy, and severe neurasthenia.

CATHCART: *Scottish Medical Journal*, April 1906, has confirmed some of the results obtained by Bier in the treatment of inflammation by passive hyperæmia.

Bier's method of obtaining passive congestion varies with the position and nature of the lesion, but a very usual method is to employ two or three turns of a Martin's bandage. The bandage must be put on with sufficient tightness to hinder the venous return, and but slightly to interfere with the arterial flow. In acute cases very slight pressure only is needed. When the bandage has been applied, it should be possible to feel any accessible pulse below it, and the limb should not be cold. This method has been used for many forms of arthritis. When the bandage is correctly applied, there is almost always a rapid amelioration in the pain although, exceptionally, in the gonorrhœal arthritis, the pain is sometimes for a short time increased. One of the great values of this method lies in the great relief it gives to the pain and the rapidity with which this relief is obtained.

In cases of acute inflammation, the congestion is, by Bier, prolonged for from 10 to 20 hours, and the limb below the bandage becomes fiery red and œdematous. In tubercular cases, the bandage is only applied for one or two hours, and cyanosis alone is produced and not œdema, as in the case of acute inflammations. This method of treatment requires great care and watchfulness for the first two or three days.

Cathcart records a case of gonorrhœal rheumatism in a woman, aged 38, characterised by severe pain in the knee. For this everything had been employed, rest, liniments, fomentations, iodides, salicylates, etc., and yet there was no improvement. Cathcart applied a piece of elastic bandage above the knee, and, in fifteen minutes, there was distinct relief. From that time onward there was steady improvement. Bier is inclined to ascribe the rapid relief of pain in these cases to the anæsthetic influence of œdema on the fine nerves.

Cathcart gives other examples (non-arthritic) supporting Bier's contention of the value of this method. He also quotes Bier's warning that it is well to learn the treatment upon sub-acute cases, or acute ones of slight severity, and not to expect infallible results.

TREATMENT BY INTERRUPTED CIRCULATION IN RHEUMATOID ARTHRITIS.

W. EWART, *Lancet*, January 7, 1906.—As a contrast to the method of Bier, this procedure is instructive :—

The limb in this case is emptied as far as possible of venous blood and lymph. In order to do this it is first raised, and then an Esmarch's bandage applied. This interruption of the circulation is maintained between the limits of 30 seconds and 5 minutes. The applications are repeated at intervals of 2 minutes, as many as six having been given at a sitting. If possible, the limb is placed in a vertical position before the ligature is relaxed, and the pressure is removed from the artery suddenly. There is then a sudden flush, throughout the limb, of arterial blood, which is transmitted to the capillaries, and to the tissues themselves, and has in itself, in the author's opinion, a stimulating effect.

The immediate results of the application of such a ligature are, that, when it is effectual, the limb remains pale and the veins empty : there is no pain in the limb.

During the period of application, the part often becomes anæsthetic, and then, as a rule, there is no pain or discomfort.

Such swellings as the soft, puffy, synovial swellings of rheumatoid arthritis usually disappear, though some of them may reappear upon removal of the ligature. Upon removal of the constriction there is a bright blush over the surface below the ligature, and the patient feels some relief from the return of the circulation to the limb.

Ewart describes, in detail, cases in which he has obtained favourable results.

Case 1.—A case of chronic relapsing rheumatoid arthritis, with swelling of the articulations of the hands and left knee, and much pain.

Case 2.—A rheumatoid case with puffy swellings of the wrists, limiting movement.

Case 3.—A case of osteo-arthritis, with fixation of the knees, right elbow, and both wrists.

Even in this case, very considerable improvement resulted, the treatment being combined with forcible extension of the knee joints under an anæsthetic, while the limbs were in the anæmic condition.

In acute cases of synovitis, immediate relief has resulted from this treatment.

TWO CASES OF FUNGATING ENDOCARDITIS FOLLOWED BY CONVALESCENCE.

NEWTON PITT: *Medico-Chir. Trans.*, 1905.

One of the most dreaded occurrences, in arthritic disorders, is the supervention of malignant endocarditis, and Newton Pitt records, in this paper, two cases, in which it seems reasonable to believe that injections of anti-streptococcus serum did great good.

The first case was that of a boy, aged 15, who had suffered from chorea in May, and was admitted to Guy's Hospital in June, 1903, suffering from severe heart disease. An oscillating temperature, his septic appearance, and emaciation, the occurrence of cerebral embolism, albuminuria, and hæmaturia, emaciation and stupor all pointed to a malignant endocarditis, which looked like rapidly proving fatal. Cultures from the blood gave a mixed culture of a staphylococcus and streptococcus.

Five c.c. of antistreptococcus serum were injected on August 3, and on alternate days afterwards. Thirteen injections were given in all, one omission being made on account of a general erythema.

The improvement, 18 days after the first injection was given, was described as remarkable, and the temperature had then fallen to normal. The improvement was continued, and, more than a year later, he was reported as able to do light work, although an organic mitral lesion was necessarily left behind, as witness to the cardiac lesion, and there was some weakness of the right hand, evidence of the cerebral embolism.

The second case, also a boy, was a pneumococcus infection. The course of pneumonia was typical, and recovery from it apparently good, when, five days after the crisis, a tricuspid

systolic bruit rapidly developed, and, for six weeks, there was slight irregularity of the temperature. In this case two injections of 10 c.c. of Panè's antipneumococcus serum were given, after which, for a few days the temperature was more oscillating, but gradually became normal three weeks later. Eventually the boy made a good recovery, although the valvular lesion persisted.

THE PHYSIOLOGICAL AND THERAPEUTIC ACTIONS OF HIGH-FREQUENCY CURRENTS, WITH ILLUSTRATIVE CASES.

RIDDELL: *Glasgow Medical Journal*, August, 1906.

The writer points out that by high-frequency currents are meant alternating ones, in which the changes, in the direction of flow, recur with extreme rapidity.

The striking feature of these currents is that they can be passed through the body, without being appreciated by the sensory or motor nerves. At the point where the current enters the body, anæsthesia is produced, although this is very superficial.

The general effects of these currents upon the circulation appears to be to produce some rise of arterial tension. The respiratory movements are increased in number and amplitude; there is an increase in the output of heat. The urine is increased, and the toxic matter is in greater quantity. There appears to be no proof that these currents have a germicidal action.

Riddell, following Laquierre and Apostoli, has used this treatment in chronic rheumatism, and finds that he gets special benefit for those suffering to a slight degree, viz., in cases of arthritis of the hands; by this treatment the pain and tenderness are made to disappear, and the enlarged joints regain their normal size.

Riddell mentions other conditions non-arthritic, and amongst these, neuritis and neuralgia. He has seen much benefit in lumbago; in sciatica, the results are variable, and, in neuralgia of the milder types, they are good.

PROPHYLACTIC TREATMENT OF POSTPARTUM HÆMORRHAGE.

By GORDON W. FITZGERALD, M.D.,
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Amid the vast and ever-increasing mass of medical literature, one cannot even hope to keep abreast, in all branches of the profession, of what is going on. Our medical training implants certain ideas about certain conditions, and, when opportunities present themselves, we put these to the test, retaining or discarding them according to the results obtained. Failures we all have, but we should beware of regarding these as always due to inefficiency of the methods, and question ourselves rather as to whether we have properly applied these methods, or, again, whether we have had sufficient opportunities for their application to warrant our discussing them with the familiarity, which only experience in their use can bring. The experience of one individual is hardly sufficient recommendation of any one method to permit of its routing and displacing methods, which have proved their efficiency, in the hands of all those who apply them properly, and with a knowledge of the reasons for their application. Nor surely does that recommendation become any more convincing because of that individual condemning all methods—save the one to which he gives adherence—as "ineffectual and indeed absurd."

The position of such an individual is that assumed by Mr. E. S. Bishop, when discussing the treatment of postpartum hæmorrhage, in a paper which appears in the August number of The Practitioner. He condemns, in the terms which I have quoted, the usually taught methods, and declares that those who teach these methods do not believe in them. To teach students the causes of postpartum hæmorrhage, he says, is but to increase their uncertainty and anxiety, when brought face to face with this complication. Teach them no causes, he suggests, for there are too many. Compression of the abdominal aorta is the only treatment of the smallest

value, we are told. The advantages held out, however, are not alluring, for it would seem that, by the adoption of this method, one is put in a position to speak of "the great majority" of cases of severe postpartum hæmorrhage. Now there are surely but few, very few, obstetricians, amongst those truly adhering to the "absurd" methods, who have seen so many cases of *severe* postpartum hæmorrhage, as to be in that position.

With so much experience, one wonders how Mr. Bishop could put put forward as a *typical* case of this complication that of a *Primipara*, (1) "a young healthy woman, who never had any illness in her life except some infantile disorders from which she rapidly recovered," and who had satisfactory first and second stages in her labour, dying of *Acute Primary Atonic Postpartum Hæmorrhage, Primary Inertia.* I am sure, even the most experienced will join with me in congratulating Mr. Bishop on having seen such a case, but is it a typical case? One cannot but regret that Mr. Bishop, in his forcible and admirable advocacy of this method, should regard all other methods as useless and treat them with such condemnation.

To discuss the treatment of Postpartum Hæmorrhage is obviously beyond the capacity of one short paper on the subject. A clear knowledge of the numerous causes is absolutely essential for an intelligent treatment of the condition, and it is a recognition of these which gives to those practising obstetrics the readiest means for its avoidance.

After a normal labour there is no postpartum hæmorrhage, and this we recognise as due to the fact that the natural forces for the control of hæmorrhage are in action. These forces are retraction, contraction, and clotting. Contraction is merely a temporary stop to the hæmorrhage, and its control of hæmorrhage may be regarded as an accident, expulsion of the uterine contents being its true function.

Clotting, too, were it aided only by contraction, would avail but little, for during relaxation the clots would be driven out. Retraction, then, is the force on which we depend for a lasting control of hæmorrhage, and, therefore, anything which interferes with its action tends to produce postpartum hæmorrhage. By retraction of the uterus, I mean that plastic force which moulds the uterine walls to its contents. I do not regard it

as dependent upon contraction, but as a force which may act independently.

That retraction is ordinarily aided by contraction, I admit, but that it is dependent upon contraction, and cannot come into action in the absence of contraction, I have as yet found no convincing proof. It is a slowly acting force, and so we usually stimulate the more rapidly acting force—contraction—not because the hæmorrhage will be permanently controlled, but because we want its aid until such time as retraction has come fully into action. This, I believe, is the rational object to have in view when adopting active measures for the control of postpartum hæmorrhage.

I do not for a moment question the fact that the hæmorrhage can be stopped by compressing the abdominal aorta, but I am of opinion that the cutting off of the blood supply of the muscle will interfere with its proper contraction and retraction. I am further opposed to the method, on the ground that it is not so easy of performance as Mr. Bishop suggests, and when possible can only be done completely in hospital, where there are numerous assistants. It is attended, too, by unnecessary and prolonged inconvenience to the patient, and, not being directed toward the removal of the cause of the condition, cannot seriously be regarded as a rational method. That elevation of the pelvis can have much influence on venous uterine hæmorrhage, I question, and especially when the abdominal aorta is compressed.

It is, however, to the prophylactic measures in our treatment to which I desire to draw particular attention in this paper.

To discuss this, one must again consider causes. Indeed I cannot conceive any treatment as being rational, which has not for its primary object the removal of the cause.

Hæmophilia must of necessity be placed amongst the causes of postpartum hæmorrhage, but the condition is one of such extreme rarity, and especially in the female sex, that it may almost be disregarded. There are very few recorded cases of pregnancy complicated by this dreadful condition. A history of the condition will be got from the patient, and the administration of arsenic, strychnine, and chloride of calcium will prove of great assistance.

When the labour starts, all precautions should be taken to avoid protraction in the first two stages, and the third stage should be as gradual as is consistent with safety. All preparations for the active treatment of postpartum hæmorrhage should be in readiness.

Should the patient have had several pregnancies following rapidly on each other, or be exhausted by disease, careful feeding and tonics, throughout the pregnancy, should receive special attention. Here, again, the labour should be made as short as is possible, the use of the forceps proving of inestimable value. Again, I would lay stress on the necessity for not hurrying the third stage.

It is hardly necessary to draw attention to the fact that, should a labour be unduly protracted, there is likely to be postpartum hæmorrhage. As to what is undue prolongation cannot be decided by fixing any time limit. To prolongation of the first stage—from the point of view of subsequent postpartum hæmorrhage—one gives but little attention, as a rule, interfering only when the membranes are ruptured. In the second stage, the patient will, by her pulse and temperature, give an indication of undue prolongation.

Some patients will go on for several hours without giving any indication of distress, while with others these signals may be observed when only an hour or two have elapsed. To disregard these indications is, I think, to favour the occurrence of postpartum hæmorrhage, for the uterus when finally emptied is unable, for some time, to contract and retract sufficiently to control the bleeding points, produced by the separation of the placenta. This separation too, for the same reason, may be imperfect, and the hæmorrhage still more favoured.

When hydramnios is present, or there is a multiple pregnancy, it is extremely necessary, for the contraction and retraction to be adequate, that the emptying of the uterus should be gradual. Puncture high up and slow draining off of the liquor amnii in the former class, and a distinct delay between the birth of the first and second child, in the latter class of cases, cannot be too strongly advocated. In both classes of cases, we have to deal with a uterus, which has been much thinned and stretched, and which will, in consequence, but feebly contract at first, and still more unsatisfactorily

retract. It is essential then to delay the second stage as much as possible, for, only by so doing, can we hope to get a satisfactory third stage. Should the patient be the subject of renal, or syphilitic disease, one should be exceedingly watchful in the third stage, fibrous bands of adhesion between the uterus and placenta being frequently present in these cases. The diagnosis of "adherent placenta" is by no means always easy to make, occurring as it may in the absence of disease of any kind, and following on a labour, which has been particularly normal. A history of its occurrence with previous labours should not be disregarded, as the following case will exemplify.

The patient, who came under observation in her fourth and fifth labours, gave a history of her second and third labours having been complicated by adherence of the placenta. The third stage of the fourth labour and also that of the fifth were completed, only with a great deal of difficulty, in consequence of the very firm fibrous adhesions which were present. Other similar cases have been observed.

Under ordinary conditions, there is a slight hæmorrhagic discharge with each uterine contraction in the third stage, should this be in excess, and the usual efforts at expulsion fail, and at the end of thirty minutes there be no diminution in the size of the uterus, it is, I think, advisable, with a gloved hand to remove the placenta. More striking evidence of the condition may be had a very few minutes after the termination of the third stage, by the occurrence of smart and persistent hæmorrhage, when interference should be at once resorted to. The danger is that one is apt to delay too long, cherishing the hope that, with the next contraction, the placenta will be separated, and, in consequence, suddenly finds that a case of severe postpartum hæmorrhage has to be dealt with. The operation—manual removal of the placenta—which is probably the most objectionable of all obstetric operations, needs to be cleanly and quickly done, and with as few introductions of the hand as possible—two at most.

Amongst the causes predisposing to postpartum hæmorrhage, precipitate labour must be included, leading as it may to inversion of the uterus, or to a condition in which the uterus, finding itself suddenly emptied, is unable to equally suddenly

accommodate itself. We may get a history of its occurrence with a previous labour, the condition being very rare in primiparæ; from a multipara, with a large pelvis, and we should regard its occurrence as likely, should there have been an extensive laceration of the perineum. Careful attention to the patient, from the start of the labour, and keeping her in the recumbent position throughout, will usually obviate the occurrence of any complications.

I have left until the last of the causes, which I shall discuss, that which I think the most important.

It is the improper management of the third stage of the labour. The anxiety to see a labour concluded is shared by all obstetricians, but too much stress cannot be laid on the necessity for avoiding any hurrying of the third stage. To lay hold of the uterus, as soon as the second stage is completed, and squeeze and massage it, and then endeavour to express the placenta—and often express it—are the most fruitful sources of postpartum hæmorrhage occurring in cases in which nature is doing her best to carry through normally. The attendant would be far better occupied were he to put his hands in his pockets, and study the pictures on the wall. Unless there is undue hæmorrhage after the birth of the child, there should be no efforts at expulsion practised, until such time as the placenta is found to be in the vagina. This can be made out with certainty, by means of the following device:—When the uterus becomes smaller and is more easily movable from side to side, gently draw all loops of the cord out of the vagina, then, grasping the uterus by its lower segment, lift it towards the ensiform cartilage. Should the placenta—in whole or in part—be still in the uterus, or the membranes be caught in the uterus, the cord will be observed to be drawn back into the vagina. Should, however, the placenta and membranes be free of the uterus, the manœuvre will have no influence at all on the cord.

Only when the placenta is in the vagina, and free of the uterus, may efforts at expulsion be safely resorted to. To at once squeeze and massage the uterus tends simply to produce irregular contractions, and too frequently imprisonment of the placenta. While forcible expulsion will, more often than not, result in portions of the placenta and the greater part

of the membranes being left behind. The satisfactory contraction and retraction are, in consequence, interfered with, and postpartum haemorrhage, as a natural result, follows. Were one to fix a time limit, I would say no interference should be made under from forty to sixty minutes, presuming that all is going well.

Want of space has compelled me to be rather dogmatic, but I may say that the methods here advocated, with perhaps slight differences in detail, are those on which stress has been laid during the past ten years at the Rotunda Hospital, in the treatment of over 30,000 cases of labour, and to which attention was particularly given during the $4\frac{1}{4}$ years that I had the privilege to be connected with that institution. They are recommended, too, by such writers as Williams, Bumm, Dakin, Webster, and several others of experience in this interesting branch of the profession. That I have not discussed active treatment is due to the fact that, adhering to the well-known old axiom, "prevention is better than cure," I believe the prophylactic measures to be of first importance in the treatment of this distressing complication of what should be a natural, physiological process.

A CASE OF SARCOMA OF THE TEMPORAL DURA MATER WHICH SIMULATED A SUPPURATIVE MASTOIDITIS.

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[With Plate XV.]

On March 7, 1905, a child, aged one year and nine months, was brought from the country by its parents to their medical adviser in town on account of a discharge from its right ear. When the doctor examined the ear, he found that the right meatus was filled by a large firm fleshy growth. The growth projected beyond the opening of the meatus, and was surrounded by purulent discharge; the right side of the child's face was paralysed.

The doctor removed a portion of the projecting growth with forceps, but, as it appeared to be something more than a simple aural polypus, he brought the child with its parents for my opinion.

The right facial paralysis was very evident. It had been first observed by the parents three weeks before, but little attention had been paid to it, as the parents had been assured by a clergyman that it would pass away when the eye-teeth appeared.

There was blood oozing from the meatus, which, on closer inspection, was found to be mixed with foul-smelling pus.

The auricle was prominent, being pushed forwards by a swelling of the mastoid. On careful examination, the whole mastoid area was found to be swollen, painful to the touch, and the central portion of the swelling was fluctuant. I advised exploration of the mastoid bone under chloroform, and for this purpose the child was taken to a nursing home.

On the following morning, the parts were exposed by a long post-auricular incision. Extensive disintegration of the mastoid was brought into view. The bone was denuded of its periosteum and necrosed in part, and masses of vascular fleshy tissue, resembling granulation tissue, filled the meatus, the

tympanum, and the antrum. In addition, the tympanum and many spaces in the distended mastoid bone contained very foul-smelling inspissated pus.

The granulations were removed by curettage, all purulent débris was washed away, the necrosed bone in great part was removed, and the surfaces left smooth.

The wound was packed with iodoform gauze, and, on the fifth day, the posterior wall of the meatus was split, and the post-auricular incision closed by sutures.

Very satisfactory healing followed, and, in fourteen days after the first operation, the child was taken home.

Three weeks later (April 14), I was told that, while the mastoid wound was firm and healthy, granulations had appeared in the meatus, and I arranged to examine the child under chloroform. The mastoid area, on examination, seemed to be firm and well, but in the meatus there was an abundant growth of soft vascular tissue, which I removed through the meatus. This was submitted, as the first had been, for microscopical examination, and again, as in the first instance, it was reported to be rapidly growing granulation tissue.

Ten days later, while the child was at home in the country, it had several convulsive seizures, and the mastoid suddenly began to swell. Two days later the child was again brought to a nursing home in town. The right mastoid area was then found to be not only swollen, but to be the seat of a large fungating mass. Despite the former reports as to the histological character of the new growth, there was now no doubt but that the swelling was a sarcomatous growth.

When the bulk of the fungating outgrowth had been removed, the incision through the skin was extended upwards and the tumour traced to its source. It was found that immediately above, and continuous with, the opening in the bone, which had been made at the first operation in clearing out the mastoid cells, the tympanum, etc., there was a large opening in the petrous portion, the centre of which might be represented by the supra-meatal triangle. On careful exploration, it was found that the tumour had its origin within the cranium, from which it had forced its way outwards, destroying the bone in its progress.

Looking to the feeble condition of the child, the nature of

Fig. 1. *Outer aspect of the temporal bone, showing the opening in the mastoid region made partly at the operation and partly by invasion of the tumour.*

Fig. 2. *Inner aspect of the temporal bone, showing the tumour* in situ.

the new growth, its size and its position, it was agreed, after some discussion, to proceed no further. The wound was packed with iodoform gauze and the child put to bed. The child rallied, and, for 24 hours, appeared to be fairly well, but suddenly and without warning, the child became convulsed, and these convulsions were followed by coma, which, at the end of 48 hours, ended in death.

At the subsequent post-mortem examination, the brain was removed along with the right temporal bone, and placed in the hands of Dr. James Walker, Assistant to the Professor of Pathology, for examination, and he reported as follows:—

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The specimen submitted consisted of a brain with the temporal bone removed together.

The brain was examined but not preserved. The temporal bone, with tumour, etc., was prepared as a museum specimen, after portion of the tissue had been removed for microscopic examination.

The Temporal Bone.—The external surface of the bone shows a large operation wound, one inch and a half in its longest diameter—the vertical. Through this opening there points a mass of tissue irregular in colour and consistence. Parts are florid, and resemble large granulations; parts are yellow, apparently infiltrated with pus. These latter parts are softer and more friable than the former. The periosteum of the skull is unusually thick.

The internal Surface of the Bone.—The dura mater is much thickened, and it adheres firmly to the skull. Over the tegmen tympani there is seen a rounded swelling, apparently growing from the dura at this place. The tumour measures one inch and three-quarters in its long diameter, is reddish in colour, and moderately firm to the touch. While smooth and rounded on its cerebral surface, the tumour can be traced externally, where it is found to be in direct continuity with the irregular mass described on the external surface of the bone.

The Brain.—The temporo-sphenoidal lobe on the right side was indented by the tumour, and showed, in addition to this cup-shaped depression, a surrounding area of cerebral softening from pressure, extending to a distance of from half to three-

quarters of an inch. The convolutions of the brain were flattened, but no other morbid change was noted. In particular there was no infiltration of the brain by the tumour, nor were any secondary deposits made out.

Sections cut, after fixing the tissue in formalin and embedding it in paraffin, show a very cellular structure.

The cells are varied in size and shape, the bulk however are large and spindle-celled. The tissue is very vascular, many thin-walled vessels are present, some of which are of considerable size. The walls of these larger vessels show, fairly uniformly, a well-marked hyaline degeneration. There are many areas of haemorrhage to be seen, and, at parts, a curious mucoid change, overtaking tumour cells and stroma alike, falls to be noted.

The tumour is a sarcoma of the mixed cell type, originating in all likelihood in the dura mater over the tegmen tympani.

THE NATURE OF MALIGNANT NEW GROWTHS OF THE TESTIS.

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(A) Any careful reader of recent descriptions of malignant new growths of the testis [1], [2], [3] must see that the last word has not been said as to their nature, origin, or classification. The characters are peculiar, though they may be described structurally as carcinoma, chorion epithelioma, endothelioma, or sarcoma.

I have recently examined such a growth of the testis, removed by Mr. T. H. Ionides, M.B., F.R.C.S., and an endothelioma, columnar-celled carcinoma, or sarcoma, are structurally represented in various areas.

It has been generally thought that sarcoma of a special type is the commonest kind of testicular new growth [3]; but cases of endothelioma,[4] carcinoma,[1] and chorion-epithelioma [1] are now being recorded more frequently.

Most of these recorded cases, as this one, are characterised by *complexity* of growth; and this is explained, I believe, as regards my own, by its origin, which I have traced to the tubules of the rete testis.

Undoubtedly, similar new growths have been labelled by different observers carcinoma, adeno-sarcoma, chondro-sarcoma, myxosarcoma, and, it is highly probable, that endothelioma and sarcoma come into the same category.[1] Still more recently,[1], [2] cases which combine carcinomatous and teratomatous, or chorion epitheliomatous characters have been described.

(B) A teratoma is defined as a growth that consists of elements, which are represented in the developing ovum, whether at an early (*e.g.*, syncytia, Langhans' cells, large mono-nuclear cells), or, at a later date (*e.g.*, neuro-epithelial cutaneous, or other elements). A chorion epithelioma is a tumour which arises, either from the chorion, or non-fœtal

portion of the ectoderm of the embryo ("trophoblast"), or from *chorionic elements present in teratomata*. Thus these neoplasms may arise *in women, in the absence of pregnancy, and also in men*. Bland Sutton uses the term teratoma in a limited sense, as tumours, which clearly arise from an included fœtus; as does Shattock.[1] The more general description of teratomata, or embryomata, is that perhaps of Marchand,[2] who excludes the symmetrically formed, but unequally developed, double monsters from the list. [The true parasitic monsters (fœtal implantations or inclusions) are, in form, size, and relations to each other, quite unsymmetrical, the parasite is quite rudimentary, irregularly developed, and depends on the other for nourishment. Two groups occur, one "intra-ammotic," which include those attached to or within the head, and the sacral ones; a second "extra-ammotic" enclosed within the body cavity. Dermoid cysts are closely related to fœtal inclusions, which may be skin sequestrations, with cartilage, bone, or gland tissue, derived from neighbouring organs. These are the dermoids of the head and neck, or mediastinum; others, more complex ones, occur in the sexual organs.] V. Bonney [1], [21], [22], [23], derives teratomata and embryomata, and chorion-epitheliomata, not originating in connection with pregnancy, from cell seclusions formed normally, or abnormally, during embryonic life. The normal seclusion may be derived from germinal epithelium, the abnormal seclusion may represent (*a*) a blastomere, (*b*) an element of one of the layers of the blastocyst (ectoderm), or (*c*) an element of one of the differentiated derivatives of one of the layers of the blastocyst (trophoblast).

Wilms regards all dermoid cysts and embryomata as springing from "wandering germ or egg cells." Beard's embryological researches support this opinion, and lead him to the conclusion that more than one primary germ cell has the capacity to form an embryo (or an embryoma).[24]

(C) The clinical history of the case is briefly as follows:—

J. F. M., 19, was admitted on June 19, 1906, under the care of Mr. T. H. Ionides, for sarcoma testis. He had noticed a swelling of the testes for ten weeks. There was a general heavy enlargement of the organ with some hydrocele. On

tapping this, a clear fluid and thin blood and débris were removed, which, when examined under the microscope, contained, to my mind, sarcoma cells. The growth was removed on June 20 by Mr. Ionides, and the wound healed well. To the naked eye it was a dark red spongy growth, and it was soft, friable, with a few small cysts with smooth walls, and yellow or reddish contents. The testis was seen compressed against the tunica albuginea, but did not appear to be infiltrated with growth. The globus major and minor were flattened, and the tumour appeared to spring from the mediastinum testis.

(D) *Histological Examination.*—About 40 sections of testis and its ducts, together with the new growth, were prepared.

(*a*) The testes were fairly normal. The tubuli seminiferi were rather dilated, or again flattened in places.

The tubules contained spermatogones (primordial cells, small round cells, with nuclei rich in chromatin), spermatocytes (mother sperm cells, showing chromatin network), spermatids (round small cells), and Sertoli's supporting cells. No spermatoblasts or spermatozoa could be identified. Near the growth, the cell elements of the tubules formed solid columns in the centre of the lumen, others contained a granular débris, and a few had undergone mucoid change. In no place did the tubules appear to have undergone a malignant change, and from them the new growth was mostly separated by a delicate connective tissue, containing round cells, which, however, was penetrated towards the mediastinum. The interstitial tissue was, on the whole, diminished, though epithelioid cells of a brownish colour were in numbers. The straight tubules contained one or two layers of flat or cubic epithelial cells, and some contained red-blood cells. These were seen to unite to form a network in the mediastinum (rete testis), and the transition of the spermatogenic epithelium of a seminal to the cubic epithelium of a straight tubule was observed. In the tubuli recti and vasa efferentia, the most interesting changes occurred, which will be described presently.

The globus major and minor and the duct of the epididymis were lined by columnar, or cubic, and stratified ciliated epithelium respectively. The spermatic cord, with the pampiniform plexus of thick-walled veins, its arteries and nerves

showed a few small collections of cells with deep staining single large nuclei, some polymorpho nuclear, and red blood cells. These resembled those cells found in the rete testis (*see* later). The vas deferens was lined by normal stratified ciliated epithelium, with well-marked epithelial crypts; in section these appear as round or oval empty spaces, surrounded wholly or in part by epithelium, and were formed by the accumulation of small epithelial cells, rather than an alternation of these with high epithelium.

(3) The growth may be described by its features as endotheliomatous, carcinomatous, and sarcomatous, but in no case typical in structure.

The *endotheliomatous* areas consisted of tubules, columns or sheets of cells, the latter grouped in irregular masses like a child's puzzle. Some tubules were lined with flat cells, which were enswathed with cubical or flat cells. The tubules were formed of one, two, or more layers of large polygonal or again of cylindrical or flat cells. Stained with pyronin and methyl green, the nuclei were large, rounded, pale, and contained chromatin in "lumps." Some of the epithelial-lined tubules had a basement membrane, and cuticular internal layer. The flat lining cells in places were swollen and resembled a syncytium. The lumen of the tubes was empty, or contained red cells, or granular débris, or a core of cells which had undergone karyorrhexis, or karyolysis, or were highly polymorphous with nuclei of bizarre shape.

The typical endothelial cell is flattened and rounded with oval or rounded nucleus, it has a large amount of protoplasm, which may be polyhedral from pressure. The nuclei is clear and its chromatin is collected at the centre and periphery. An endothelioma is characterised, according to Lazarus Barlow, by its bright, well-stained, appearance, by its cells, which are in excess of stroma in the centre and older parts of the growth, whereas carcinoma cells are more closely packed, and their nuclei take a deeper stain, and the cells may be oval or spindle. If the cells, lining a lymphatic or other vessel, proliferate centrally, an endothelioma results, and, if peripherally, a perithelioma, which thus differ from angeiosarcoma.[5]

The *carcinomatous* portion consisted of columns of high

epithelial cells, which had large, pale, oval, or amœboid looking nuclei, or again deep staining nuclei, rounded and even twisted, or mitotic nucleoli were present. The cytoplasm was moderate and granular, or scanty and deep staining. The section of solid columns contained cells arranged in some places in such a way as to slightly resemble cell "nests." The alveolar stroma was present only in places nearest the testis, and was represented elsewhere as a delicate stroma, supporting the epithelium. Extensive mucoid degeneration, hæmorrhage, and necrosis were present. There were endothelial-lined spaces which contained red-blood cells, and lymphocytes. The flat lining cells were enlarged in places and formed projections into the sinuses, and external to them were clear well-defined rounded cells in layers which together have a superficial resemblance to syncytium and Langhans' layer.

In the main the "stroma" of the growth was luxuriant and vascular, but of very varied structure. It was chiefly cellular, with plasma cells in numbers, but there was much wavy connective tissue. There were areas of embryonic, round, or long spindle cells, quite sarcomatous. There was necrosis of large tracts. It contained a few tubules, lined with cubical, or columnar cells, solid columns of endothelial-like cells and endothelial-lined clefts containing red cells, granular débris and cell elements, some of these spaces were lined by rounded cells in one or more layers.

The corpus Highmori and rete testis Halleri, which normally consist of anastomising tubules, or spaces lined by cubic, or flat epithelium, had undergone an interesting change, which appeared to be the precursor of the malignant new growth. The spaces had become large and tortuous, and thus resembled dilated lymphatic clefts, or small round cysts. Their lining was high, or cubical, or flat heaped-up, cells, or was merely the stroma of the corpus. Some were empty, some contained hyaline material, apparently derived from mucoid changes in the lining cells, others contained mono-nuclear cells, which were highly phagocytic to erythrocytes, and appeared swollen as if undergoing mucoid degeneration. Some were multinuclear, and appeared to have been associated with the enlargement of their containing spaces (? by mutual inter-

action). There were white and red blood cells in others. These cavernous spaces passed into glandular tissue on the one hand and into new growth on the other.

(E) *Diagnosis.*—A malignant growth of the testis, arising from the mediastinum, and the seat of extensive hæmorrhagic, necrotic, and mucoid changes. It bears a resemblance to a teratoma, or chorion epithelioma, in these characters, in a syncytial like appearance of the endothelium, and in its general complexity, and gland-like, epithelial-lined tubules. There are, however, no definite chorion-epitheliomatous cells present, and no true representatives of the three "primitive" layers, and its characters are explained by its origin from the tubuli recti, which are of mesoblastic (mesothelial) origin, so far as is known.

Dr. Lazarus Barlow and Professor Robert Muir, who have kindly examined my sections, consider the structure as probably carcinomatous, the latter adding that it is difficult to distinguish definitely from an endothelioma, and Dr. V. Bonney, who has also similarly favoured me, while thinking that it is an adeno-carcinoma, believes that it is teratomatous. Dr. Bonney saw no chorion-epitheliomatous tissues, but cells "suggestive of the type of cell that is a precursor to it."

(F) *Chorion-Epithelioma of Testis.*—A description of the histology of a chorion-epithelioma has an important bearing on the recognition of these testicular growths. In the first place, Langhans describes a *villus*, at about the sixth week of gestation, as of mesoblastic stroma, containing blood-vessels, enclosed in a double layer of epithelium. The inner layer of Langhans is of cubical cells with *clear* protoplasm, round or oval, vesicular nuclei, relatively large, with network of chromatin. They often rest on a well-marked basement membrane, and are enclosed by the syncytium. This is a layer of *opaque* protoplasm, in which no definite cell boundaries are recognisable, and which stains rather deeply. The nuclei are smaller and more solid than those of Langhans' layer. The syncytium forms buds, which may become detached, and lie as multi-nucleated giant cells in the maternal blood, or may resemble an endothelium. A fringe of protoplasmic processes may be present. Here and there Langhans'

layer spreads out into masses, and the cells increase in size. There are also cells which conform to neither of these types; they are large, and contain one or more nuclei. The Peters ovum shows the origin of these layers to be the fœtal epiblast, "trophoblast," and not from the maternal tissues, which are destroyed by parasitic invasion of ovum. Teacher describes a chorion epithelioma as follows:—It does not contain connective tissue, stroma, or blood vessels of its own. The syncytium consists of large giant cells of various shapes and sizes, of long irregular bands or whorls. The nuclei are rather small, and stain uniformly, but clear vesicular nuclei may be present. The cytoplasm is opaque, and stains deeply. Mononucleated cells are seen derived from Langhans' layer, small, and closely packed with round, clear nuclei, *large relatively to the cell*. The cytoplasm is clear and light staining.[2]

(G.) *Recorded Cases of Carcinoma Testis.*—Comparatively few cases of carcinoma testis have been recorded. Several cases of chorion epithelioma testis, however, contain a reference to the presence of carcinoma in the growth.

Kanthack and Pigg record a case of Sir James Paget's,[6] and, again, another.[7] Poland[8] records a case of columnar-celled carcinoma testis, as does Foulerton.[3] Steinert records a case of Schmorl's of teratoma testis, which showed a small typical area of chorion epithelioma, and, in the metastases, were large spaces lined by cylindrical epithelioma, showing carcinomatous changes.[9] Emanuel describes a similar case, which he considers to be one of simultaneous carcinoma and chorion epithelioma of a teratoma testis.[10] V. Hansemann reports a case of chorion epithelioma testis, on which some of the gland metastases were lined with cubical and columnar epithelioma.[11] Dillmann records a case of chorion epithelioma of lung in which the testis was of normal size, but near the hilum was a whitish mass of the size of a cherry, the epithelioma of which appeared to be proliferating to form masses of "Langhans'" cells, with a carcinomatous arrangement.[12] Risel,[13] Askanazy,[14] Schlagenhaufer,[15] describe cases of chorion epithelioma testis, with cysts, or tubes lined with epithelioma. Wlassau[16] records four cases containing tubules in a fibrous stroma, which he derives from embryonic gland tubules, not *tubuli testis*. The mesoblastic tissues were not

the stroma of a carcinoma, but were derived from an embryonic inclusion. Again Hicks gives a case, in which the periphery of the tumour of the testis was a spheroidal cell carcinoma with tubules, but near the hæmorrhagic area was typical chorion epithelioma'. Spilsbury described a chorion epithelioma with masses of rapidly growing carcinoma, with myxomatous connective tissue and sarcoma, and Lawrence also a case with a carcinomatous structure.[1]

Recorded Cases of Endothelioma Testis.—E. J. Wood[17] describes an endothelial metastasis in the kidney from a testicular sarcoma. The section contains large polygonal cells packed tightly together with large nuclei staining well, and poorly staining cytoplasm arranged as in endothelial growths. Sternberg[18] has collected 15 such cases. One is described as of interlacing columns of cells, in one or two rows around a capillary, the cells were large, round, or oval with readily stained nuclei, while the cell protoplasm did not stain easily. Some columns were solid and non-vascular. Thus the tumour had an alveolar aspect. Some time the new formations projected into larger vessels, and in the walls of the capillaries were masses of protoplasm, with one or more nuclei. The stroma was very cellular. Krompecher[19] reviews 14 such cases. In one class, the development is in definite alveoli of endothelial cells, in another it is diffuse (lympho-sarcoma). MacCallum[20] records a case of lymph endothelioma testis, which is claimed by others[2, 6] as teratomatous (chorion epitheliomatous).[7]

Recorded Cases of Chorion-Epithelioma.—V. Bonney[5] gives a good description of recorded cases of chorion epithelioma testis, with sixteen references, in the *Archives of the Middlesex Hospital Cancer Research Department.* Several of these are referred to previously in this paper as presenting a carcinomatous structure ; the others contain histologically representatives of chorionic, or teratomatous structures.

(H) *Development of the Testis and its Ducts.*—As I trace the origin of the growth to the rete testis, so its complexity of structure can be explained from the developmental origin of these tubules, apart from any "normal seclusion" of the germinal epithelium.

The epithelium of the tubuli seminiferi is derived from

the "germinal" epithelium, which forms the meso, or endothelial lining of the pleuro-peritoneal cleft, and is derived from the mesoblast.

The epithelium of the Wolffian duct is derived from the epiblast, which invaginates, and becomes embedded in the intermediate cell mass. From the epithelium of the Wolffian duct is derived the epithelium of the vas deferens and duct of epididymis. Thus, it is believed, that there is a union of secretory tubes of mesoblastic origin, with a duct of epithelial origin, just as it is thought that the tube, which forms the glomerulus and first convoluted tubule of the kidney, is of the same germinal "epithelial" (endothelial) origin, and unites with the tubule of the Wolffian duct. (Foulerton[3] suggests that the Wolffian epithelium forms the secretory tubules of kidney and testis). The relation of the epithelium and the tubes of the rete testis to the sperm tubes, on the one side, and the duct of the epididymis, on the other, is uncertain, but probably it is derived from "germinal" mesothelium.

I explain the endotheliomatous, carcinomatous, and sarcomatous characters of this and other testicular neoplasms, in which no teratomatous elements are present, as arising from the potentialities for growth of "mesothelium" (mesoblast) of the rete testis, from which I have traced the origin of this case.

The syncytium-like appearance may be due to the hæmorrhagic and mucoid changes, and partly to the effect of the blood-stream upon a malignant growth. Thus, syncytia have been observed by Schmidt in cancerous emboli of pulmonary arteries, secondary to abdominal carcinoma, and it is believed that syncytia are the first stage in destruction by blood, of any actively-growing epithelium in the blood-stream.[1] I cannot account for the glandular structure of the testis being completely spared from invasion.

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THE IMMEDIATE TREATMENT OF RUPTURED PERINEUM.

By D. T. BARRY, M.D., D.P.H.,

Cork.

ALL text-books of Obstetrics and Gynæcology recommend immediate suture in cases of ruptured perineum.

Montgomery describes four stages or degrees of rupture, according to whether the injury involves merely the fourchette, the perineum proper, the sphincter ani, or the wall of the rectum. It is to cases of the second and third degree, which are most commonly met with, that I wish especially to refer.

My object is to attempt to show that suture is not only unnecessary, but that sometimes it may be a cause of non-union. Sutures in any wound are used for the purpose of holding the edges in apposition till repair has sufficiently advanced to keep them so. Now apposition in a ruptured perineum is only disturbed by independent movements of one thigh apart from its fellow. This is of course best marked in abduction combined with external rotation, the position adopted by most patients while occupying the dorsal decubitus after labour. If we prevent these movements, we prevent separation of the raw surfaces.

Herman says :—"The proper treatment of ruptured perineum is to sew it up without delay. It is true that many cases of incomplete rupture, and a few of complete rupture, will heal without stitches, and that it is difficult for an accoucheur single-handed to accurately sew up an extensive rent. But the stitches can do no harm."

If many cases heal without stitches, why not all? The simple expedient of tying a handkerchief or cotton bandage round the thighs above the knees will effect this result. The knot must be placed on the extensor aspect in the hollow between the limbs.

Movements of both thighs, when tied together, only take place in the direction of flexion or extension, and do not affect the apposition of the raw surfaces. One finds, as a

matter of experience, that under these conditions they are kept either horizontal or very slightly flexed.

Strict instructions must be given not to have the bandage disturbed for four days. If it is once removed, and separation of the thighs permitted, the object may be frustrated. Difficulty may be experienced with micturition, but such difficulty is exceptional. Most patients can easily pass water into a bed-pan by turning well over on the side, almost reaching the prone position if necessary. Should this not succeed, it will be better to pass a soft rubber catheter night and morning.

A *sine qua non* for the success of this proceeding is asepsis. But asepsis is also essential for the successful result of suture. Cases are seen in which sepsis and non-union are almost certainly due to the suture material. Suppuration occurs in the suture track as well as in the raw surface. Collection of the lochia in the wound has been especially referred to by most authorities as a source of mischief. Such collection is not likely to occur unless separation is allowed; the lochia travel along the path of least resistance—the vagina.

Sponging with a ·1 per cent. chinosol, or corrosive sublimate, lotion, and the application of a baked or scorched pad of Gamgee tissue may be done two or three times daily.

To most women, the suggestion of a stitch or two after the trials of labour is a source of terror. Should she be under the influence of an anæsthetic, there is still a difficulty. It is even now the custom amongst nurses and patients' friends to regard with a certain amount of doubt an accoucheur who allows a patient "to be torn." With the necessity for stitches obviated, the gravity of the offence is reduced to vanishing point.

I have adopted this method in nearly one hundred cases of rupture, and have come to the conclusion that failure of union is quite exceptional, and results only from sepsis. In cases of complete rupture, involving the mucous membrane of the rectum, sutures must be inserted, but never without a general anæsthetic.

Prize Essay.

THE ÆTIOLOGY, PATHOLOGY, SYMPTOMS, AND TREATMENT OF INFANTILE PARALYSIS.

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The term infantile paralysis is applied to a disease of acute or sudden onset, occurring commonly in young children, and characterised by a purely motor paralysis of a flaccid type, without any alteration in sensation, but usually followed by subsequent wasting of the part affected.

It will at once be seen that this definition confines the term infantile paralysis to a paralysis of spinal origin, the paralysis of cerebral origin being classed as infantile hemiplegias, which present clinically quite a different picture.

ÆTIOLOGY.

Several interesting and important points are brought out in an investigation into the ætiology of infantile paralysis, and the following are the more important ætiological factors concerned in its production :—

Age.—Ninety per cent. of acute cases occur during the first decade, and by far the greater number during this period occur during the first three years of life, the majority during the second year. After the end of the third year, the disease becomes less frequent, and after six years, it may be considered rare : cases, however, do occur both in adult life and in old age.

Acute Specific Fevers.—The second most important ætiological point, in connection with infantile paralysis, is its relation to the acute specific fevers. It has been observed to follow scarlet fever, measles, whooping-cough, diphtheria, and also pneumonia, and the relationship is too intimate to be considered merely as accidental.

Cold and Exposure.—Exposure to cold and damp appear to be, at any rate, predisposing factors, and some cases have been observed to follow traumatism.

Seasonal Relationship.—There is a very definite relationship between the season of the year and the time when this disease is most prevalent. It is commonest during the hotter months of the year, especially during July and August, the curve showing a strong rise towards the end of May, reaching a maximum in August, and descending somewhat abruptly during November. A further most interesting fact in connection with the ætiology of this disease is its occasional occurrence in epidemic form, Strumpell and Marie first suggesting an infective origin for the disease. Numerous outbreaks have been reported from different parts of the country from time to time, other parts of the same country being, at the same time, practically free from the malady. In this connection, Dr. Pasteur has reported a very interesting series of cases occurring in the same family, in which two members had definite attacks of anterior poliomyelitis, a third an attack of hemiplegia, two others had definite febrile symptoms without any paralysis, and two more had certain nervous manifestations which passed off rapidly in a few days. All the children were taken ill within a few days of one another, and the different clinical manifestations were, in all probability, the outcome of a similar primary infection. No specific organism has, however, hitherto been isolated. Sex appears to exercise no influence upon this disease, statistics showing that it occurs equally in either sex.

PATHOLOGY.

The essential lesion in infantile paralysis consists of an atrophic destruction, more or less complete, of the large motor cells in the grey matter of the anterior horn of the spinal cord, usually affecting either the cervical, or lumbar enlargements, and more commonly the latter, but the exact pathology of the lesion, and the precise manner in which this destruction of anterior horn cells is brought about, are at present more or less *sub judice*. All observers are agreed that the vessels of the affected areas are thrombosed, and that there are signs of inflammatory reaction around them, but the question, as to whether such thrombosis is a primary or secondary condition, is one upon which opinions differ. The view at present most widely accepted is that the disease is infective in origin, and that the changes which result are inflammatory

in character, and the fact that the disease is most common during the hot period of the year, that it occurs at times in epidemic form, and its intimate relationship to the acute specific fevers, are all facts which go far towards establishing its infective origin. On the other hand, it must be admitted that there is much to be said in favour of the process being dependent upon a primary thrombosis of the vessels. The rapid onset of the paralysis is much more like a vascular than an inflammatory lesion. The limitation of the destructive process to the area of the cord, supplied by a branch or branches of the artery of the antero-median fissure of the cord, and the marked resemblance of the pathological appearances presented by the lesion—viz., multiple extravasations and subsequent softening—to the condition found in the brain after thrombosia of the smaller cerebral vessels, are all points worth careful consideration from the point of view of a primary thrombosis of the vessels being the chief cause of the lesions found. Further, the absence of any obvious leucocytic changes tends somewhat to support the theory of a primary thrombosis, and also the wide distribution of the paralysis, at the onset, is easily accounted for by the vascular disturbance taking place in the artery of the antero-median fissure, which supplies the whole of the anterior horns, and the fact, that smaller areas of thrombosis are found at different levels, is only what might be expected as a result of the retardation of the blood stream in the vessel ; and again, the fact, that the lumbar region of the cord lies at a point most distal from the blood supply, might explain why this region is most frequently affected.

It is outside the scope of this paper to enter into the minute histological pathology of this lesion, but a few of the more important facts may, with advantage, be briefly summarised. During the acute stage, the surface of the cord and its membranes presents no abnormal appearances, but, on section, the grey matter of the anterior horns is deep red in colour, and is found to be softened and engorged. The focus of distribution is generally most acute at one spot ; usually in the lumbar region, and from this focus the congestion extends for a variable distance. Microscopically, the process is seen to have a far wider distribution. The vessels of the anterior horn are, as has already been mentioned, thrombosed, and usually

show signs of endarteritis. In the region, where the lesion is most acute, few, if any, nerve cells can be detected, whilst at the point, where the lesion has been less acute, the anterior horn cells are seen to be swollen, and, in the later stages, show degenerative changes. In an old case, the anterior horns can be seen to be much reduced in size, and there is a marked increase in the neuroglia. No nerve cells, or fine medullated nerve fibres, can be seen in those situations where the process has been most acute. In addition, the anterior nerve roots are secondarily affected with degenerative changes, and later undergo atrophy, and, in the acute stages, the peripheral nerves also show signs of degeneration, and, in some cases also, degenerate nerve fibres, probably endogenous in origin, can be seen scattered throughout the antero-lateral columns of the cord, and, occasionally, even in the posterior columns as well.

Any account of the pathology of infantile paralysis, however brief its character, can hardly be considered complete without, at least, a passing reference to the changes which take place in the affected muscles. These undergo rapid atrophy, the individual fibres becoming gradually smaller and smaller, but they always retain their transverse striation even when their atrophy has proceeded to an extreme degree. The fibres rarely show fatty degeneration, though there is often an increase in the inter-fibrillar fat. It is also interesting to note that, even though a muscle may show an extreme degree of atrophy, normal muscle spindles, supplied by perfectly normal nerve fibres, can always be detected, the nerve fibres supplying them, arising from the posterior roots.

SYMPTOMS.

Three stages can be observed clinically in a case of infantile paralysis, and these are as follows :—

1st stage, or the stage of fever, obvious illness and paralysis, this stage usually lasting any time up to a fortnight.

2nd stage, or the stage of gradual improvement. This stage is reached when the acute febrile symptoms have subsided, and the transient paralysis, which may have affected all four extremities, and, in some cases, even the muscles of the trunk, has cleared up, leaving certain muscles of one or more limbs paralysed.

3rd stage. This is sometimes called the chronic stage, and is reached, when there is no further atrophy or recovery of power in the affected muscles. It is in this stage that deformities are so liable to make their appearance.

In addition, some authorities describe an intermediate, or stationary period between the first and second stages described above, lasting any time up to four weeks, during which rapid muscular atrophy is taking place without any visible signs of recovery in the affected muscles.

The onset of an attack of acute anterior poliomyelitis is sudden, and, as a rule, there are no prodromal symptoms, the exact mode of onset is, however, by no means always the same. In a large number of cases, the child goes to bed perfectly well, and wakes up during the night, often screaming with pain, and, if old enough, the little patient may be able to indicate that the seat of the pain is in the back, or in one or other limb. The child resents all interference with, or movement of, the limb, the temperature is raised, vomiting may occur, and there is marked general malaise. Convulsions may occur at the onset.

Another possibly more common clinical type of onset is that in which the child is taken ill with slight febrile symptoms, headache, vomiting, and possibly diarrhœa, and some pain in the back, and, after being kept in bed for a day or two, it is noticed that one or more limbs are paralysed. It is during this stage, that the diagnosis is frequently overlooked, and the case often considered to be one of rheumatism, rickets, acute osteomyelitis, or even some cerebral lesion. Another form of onset is described by some authors, in which there is a rapid, or, in some cases, gradually progressive paralysis, without any marked constitutional symptoms being present, but this mode of onset is not the usual one in children, but is more frequently seen in the adult type of infantile paralysis. It is now necessary to consider the symptoms of this lesion in rather more detail.

Temperature. — The temperature generally rises pretty rapidly to 102° F. or 103° F., and usually returns again to normal by the end of the first week. In some cases, however, it may remain high for a considerably longer period, especially if pain on movement still persists in the affected limb.

Pain.—Pain is commonly present at the onset, but generally passes off within a few days, so that the limb or limbs can be passively moved without giving rise to any pain. It varies considerably in degree in different cases, and its situation depends largely upon the site of the lesion. As this is usually in the neighbourhood of the cervical, or lumbar enlargements of the spinal cord, pain is usually present either in the neck, or lower part of the back, and there may be some muscular rigidity in these situations. The pain is generally also referred to the affected limbs.

Sensation.—Although pain is often referred to the affected limb, no alteration whatever in either light or deep touch can be detected.

Paralysis.—In the earliest stages, the paralysis often passes undetected, but can always be found, if careful examination is made, with a view to its recognition. The extent of the paralysis usually reaches its maximum within 24 or 48 hours from the onset of the first symptoms, and, in some cases, in even a shorter time. The distribution of the paralysis at the outset is variable, and may, in some cases, be very extensive, though the ultimate seat of election is undoubtedly the lower limb; in the majority of cases, the muscles most frequently affected being those of the anterior tibial, or extensor group. The amount of the paralysis during the acute stage is always in excess of that found at a later date, and may be, as has been already mentioned, very extensive. In severe cases, the paralysis may at first affect all four limbs, and even the thoracic and abdominal muscles as well, so that respiration may be carried on by the diaphragm alone. Within a week or two, however, the general paralysis, if present at the outset, usually clears away, and the residual paralysis is generally found to be limited to one or more limbs, or it may even be to a single muscle, or group of muscles. Such groups are invariably muscles of associated function. The lower limbs are more frequently affected than the upper, as has been already noticed, and, whilst a paraplegic distribution of the paralysis is common, a hemiplegic one is exceedingly rare. In some cases, the paralysis may be confined to one limb from the commencement.

The paralysis rarely extends to the cranial nuclei, but

cases, in which the muscles of the face were affected, have been described. The sphincters also are rarely affected, but, when the lesion is extensive and involves the lower sacral region, both sphincters may be involved.

The paralysis is always flaccid in character, and there is a complete absence of tonus in the muscles affected, but it is an interesting point to note that there is sometimes a certain amount of rigidity in groups of muscles, represented by segments in the cord adjacent to those actually involved in the lesion.

Reflexes. Muscular Wasting. Electrical and Trophic changes.—During the first or acute stage, the reflexes, both superficial and deep, are lost in those parts of the body that are affected. Wasting of the muscles can usually be detected within a fortnight, but it should be remembered that the atrophy, which the muscles undergo, is not always obvious, and that often, in fat infants, very little difference in measurement between the two limbs can be detected, although the one is flaccid and the other is firm and moved in a normal manner. Conversely, it must be remembered that, if the disease occurs at the time when an infant is beginning to lose its excessive fat, an exaggerated estimate of the amount of muscular wasting may be made, if this factor is not taken into account. Electrical examination during the second stage of the disease shows the presence of the reaction of degeneration, *i.e.*, the muscles react very slightly, or not at all, to faradism, but give a brisk response to the galvanic current, and the A.C.C. being greater than the K.C.C. Fibrillary tremors are occasionally to be noted in connection with the muscles, but are not common.

The temperature of the affected limb is markedly lowered even in the early stages of the disease, the limb is usually of a bluish colour. The difference in temperature between the two limbs, in cases where one only is affected, is sufficient to be readily detected by the observer's hand, amounting in some cases to several degrees. In old cases, further evidence of trophic changes can be seen in the bones, which become thinner than normal, and in the skin, which generally remains of a bluish colour, very smooth and very loose on the subcutaneous tissue. The hair of the limb remains normal,

and it is stated that the erector muscles of the hairs are unaffected. During the second stage of the disease, although atrophy of the muscles is in active progress, return of power is also taking place in them. Those muscle fibres represented by cells in the cord, which have become hopelessly destroyed, undergo rapid atrophy, whereas those cells, which have not been irreparably damaged, undergo recovery, with a corresponding recovery of those muscle fibres which they represent. In some cases, the recovery of muscular power is comparatively rapid, and there may be a fair degree of recovery, within two or three months, whilst in other cases it is a much more gradual process, and may be prolonged over a year or more. After two years have elapsed, very little further improvement is to be expected. During the third stage of the disease, when no further atrophy or recovery is taking place in the affected muscles, the knee jerk is absent or present according as to whether the quadriceps extensor muscle, and especially that portion of it formed by the vastus internus, is or is not involved in the lesion. During this stage, also, the electrical excitability is so diminished in the paralysed muscles that they usually react to neither faradism nor galvanism.

Deformities and their Production.—During the second stage of the disease, the deformities, so often seen in connection with infantile paralysis, begin to develop, and the process once started may go on almost indefinitely. The cause of the production of deformity has been a matter of some dispute, and it is generally ascribed to the tonus which is present in the unaffected muscles; some authors attribute it to the force of gravity, together with the organic contraction, which occurs in the affected muscles, and to the lack of development in the muscles and tendons whilst the osseous structures continue to grow in length. There is no doubt that all these factors have their influence, but in the deformities, produced in the earlier stages of the disease, it is certain that the most important factors in their production are the group, or groups of muscles affected, and the extent of their implication, together with the effect of "tonus" in the normal or only partially paralysed muscles.

This fact is well illustrated in the contrast there is between a case, in which all the muscles below the knee are paralysed,

and one, in which only one group is affected. In the former case, there is simple placidity of the limb with little or no actual deformity, whilst in the latter, there is well-marked talipes, equinus or calcaneus, according to whether the extensor or flexor group of muscles is paralysed. In some cases, an arrest of development occurs in the affected extremity, one limb, after a few years, being shorter than the other. In these cases, spinal curvature is liable to develop, or this condition may also result from a primary unilateral involvement of the erector spinæ muscle.

Following on the flaccidity of the muscles, secondary changes may take place in the joints, the ligaments stretch, and the joint tends to fall away from its socket; this is especially well seen in the case of the shoulder joint, and the head of the humerus can sometimes be felt to hang below the glenoid cavity.

The disease now remains stationary, and, in some cases, for life, but it is extremely interesting to note that, in some cases, progressive muscular atrophy has developed later, either in the extremity originally affected, or in one of the previously unaffected limbs.

TREATMENT.

With regard to the treatment of infantile paralysis, it must be admitted that, in many cases, judging by the after effects, the treatment usually adopted cannot be considered wholly satisfactory. One morning spent in the orthopædic department of any large general hospital will convince the most casual observer of this fact. The course most commonly adopted at present is more or less as follows. The child is kept in bed for a variable period, till all febrile and constitutional symptoms have subsided, and after a longer or shorter period, and more often the former, finds its way into the hands of the orthopædic surgeon, who is now its only hope, more or less hopelessly crippled. It would be unworthy to disparage in the slightest degree the work of the orthopædic surgeon, whose results can frequently only be described as brilliant, but from the patient's point of view they can hardly be described as altogether satisfactory, often involving a very prolonged course of treatment, including,

in some cases, repeated operative measures, and the use of mechanical appliances, which often cause the patient great discomfort. The treatment of the deformities, so often seen in connection with infantile paralysis, is outside the scope of this paper, and it is, in the second stage of the disease, after the subsidence of the acute febrile symptoms, and during which a variable amount of recovery in the affected muscles is taking place, that all one's efforts must be devoted towards neutralising, so far as possible, the after-effects of an attack of acute anterior poliomyelitis.

At the onset of the disease, the treatment is practically that of an acute febrile attack, little or nothing can be done to cut short or modify the actual lesion. The child must be kept rigidly in bed, and as quiet as possible. A milk diet must be adhered to, the bowels kept open by means of mild laxatives, and measures taken to ensure the child obtaining a requisite amount of sleep. A cradle should be used to keep the bed clothes off the lower limbs, for, if the nuclei of the extensor nerves are chiefly affected, their weight, acting upon the toes, will accentuate and increase the effects of any extensor paralysis which may exist. During this stage, a light leather or poroplastic splint, rectangular in shape, may with advantage be used in cases in which the lower limb is affected, in order to keep the foot at right angles to the leg.

If pain is a prominent symptom in this stage, it may be treated by the application of hot fomentations, leeches, or by counter-irritation. It is of the first importance, during this early stage, that the limb should be kept thoroughly warm, and this can be best effected by bandaging it lightly over cotton wool, and, if necessary, hot-water bottles may be used, but if they are, care must be taken, as on account of the vasomotor disturbance which exists, if any burn should result, it will be slow in healing.

As soon as the acute stage has passed off, and the pain and constitutional symptoms have subsided, there are four chief aims to be kept in view with regard to treatment, viz.:—

1. To ascertain, so far as possible, the exact extent of the damage done.

2. To anticipate, and prevent, so far as possible, the advent of any definite deformities.

3. To maintain the nutrition and tone of the muscles of the limb, and especially the unaffected ones.

4. To train, or it may be to re-educate, the child in the use of the injured limb under its new conditions, in such a way as to gain the maximum amount of benefit from the action of unaffected, or only partially paralysed muscles, and also to train them, so far as is physiologically possible, to take the place of those muscles which are functionless.

Of these four aims, the last must be considered the most important, not only intrinsically, but also from the fact that, in its accomplishment, the third aim is also most effectively secured; since there is no external stimulus which can be applied to a muscle in order to maintain its tone and nutrition, at all comparable with the stimulus, which reaches it from the central nervous system by means of its own nerve.

The satisfactory determination of the exact amount of permanent damage, which will result in any given attack of anterior poliomyelitis, is by no means always an easy matter. The period of acute febrile disturbance is followed by an interval, to which succeeds a period of gradual improvement, which lasts for a variable length of time; and it may sometimes be six months before the exact extent of the final paralysis can be fully and precisely ascertained, but, in the majority of cases, a very fair estimate may be obtained, within a very much shorter period, by a careful investigation of the electrical reactions of the muscles of the affected limb.

Should an early commencing deformity be detected, a suitable light leather, or poroplastic, splint should be worn at night, in order to correct it so far as possible; and, during the day, as soon as the child attempts, or is trained, to use the affected limb, careful watch must be kept to prevent it from using it in such a way as to increase the tendency to any particular deformity in course of development.

As soon as the acute symptoms have subsided, and all pain disappeared, massage and passive movement should be instituted, and, of the two, the latter is the more important, resistance movements being especially valuable. Massage once a day, and passive movement at least three times a day, should be carried out with the utmost regularity. With regard to the use of electricity in these cases, it is sometimes of great

value, but the benefits, which are said to result from its use, have possibly been somewhat over-estimated, and there is a risk of over-stimulation of the unaffected muscles, which may tend to increase any developing deformity. In cases, in which the muscles react to the faradic current, benefit often results from its use, and if over-stimulation of the muscle is avoided, no harm is likely to result.

In those cases, in which the muscles react only to the constant current, one great difficulty often arises. The majority of children strongly object to its use, and, while they will often stand a faradic current strong enough to send the observer's muscles into tetanus, they will often not tolerate a galvanic current sufficiently strong to produce muscular contraction, in which case no object is gained by its use. In short, each case must be judged on its merits with regard to the use of electricity. During this period, the general health of the child must be attended to, and the use of tonics, of which strychnine is perhaps the best, may, with advantage, be administered.

As soon as possible, the training of the child in the use of the affected limb must be commenced, in the same way as, after the surgical treatment of the deformities which may result later, the patient has to be taught the proper use of his restored foot. It is by this latter means that the greatest hope probably lies in preventing, or neutralising the complicated deformities so often seen as an after-result of infantile paralysis. That such a process requires time and unremitting patience cannot be denied, and, it must be admitted, may in some cases be impracticable, but, if efficiently carried out, it will often meet with success, and even if the results are disappointing, and the case ultimately require surgical measures, the surgeon will find a fairly satisfactory limb upon which to work, and moderately healthy muscles, into which to transplant his tendons, instead of, as is so often the case, a more or less hopelessly withered limb, the responsibilities for which are shared partly by the effects of the infantile paralysis, and partly by disuse atrophy.

THREE BEST REPORTED CASES.

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AN UNUSUAL SEQUELA OF INFLUENZA.

A. B., age 45, on February 26 developed influenza, which was then very prevalent. Contrary to advice, he went to London on business, but feeling too unwell to complete it, returned on the 28th. At 4 p.m. that day his temperature was 101°, and he complained of aching limbs and back, much lassitude, and slight headache. He went to bed and was treated for influenza. In the early hours of the morning, he had an attack, which was the first of a series extending over the next 36 hours. The attacks resembled, in so many respects, the effects of strychnine poisoning, that careful enquiry and observation were needed before this possibility could be negatived. Without warning, and with no loss of consciousness, the muscles of the limbs and trunk were thrown into spasms, lasting for from one to three minutes. The spasms were accompanied by very little pain, but by a most intense irritation of the skin. So intense was the itching of the skin, immediately after the attacks, that relief could only be obtained by scrubbing with a nail-brush. Between the attacks, which recurred every hour or so, the patient showed little signs of being ill, and discussed his case with me. There was no headache, nor retraction of the head, no rigidity of muscles, no vomiting, nor difficulty in swallowing, no rash, nor herpetic, nor petechial eruption, nor were the attacks started by peripheral irritation. Ice to the spine gave no relief, and chloral, morphia, and the administration of chloroform failed in turn to check the attacks. Death occurred from exhaustion at 5 p.m. March 2, 48 hours from my first visit. The case suggests a rapid invasion of the spinal meninges by some pathogenic organism, either influenzal, or the diplococcus pneumoniac.

COCAINE POISONING WITH UNUSUAL SYMPTOMS.

A trained nurse, age 29, in order to test a solution of cocaine, which she thought had lost in strength, injected into

her arm, at 2.30 p.m., an amount which contained about five grains. Immediately afterwards she felt cold, but not knowing that cocaine had any but a local action, did not attribute this to the injection. Half an hour later, still feeling cold, she went to have a hot bath. She remembered trying to get to the bathroom, and feeling that the effort to do so was like climbing a steep hill, and produced breathlessness. After this she remembered nothing until next day. At about 3.30, she was found in a semi-conscious condition on the floor of the passage leading to the bathroom. Her pulse was then very feeble, her extremities cold; the pupils were widely dilated, and her eyes had a vacant fixed stare. Her respirations were shallow and jerky. There was neither vomiting nor sweating.

She was carried to bed, and brandy and hot coffee were ordered; there was, however, much difficulty in getting her to swallow any. Neither could she be induced to lie down, but supported herself upon her left elbow and remained staring fixedly at the ceiling. When spoken to, she answered "yes" or "no" at random, and after an interval of several seconds; but she remarked once or twice that it was cold. She remained in this condition until 1 a.m. when she fell asleep. After a few hours she awoke, feeling giddy and weak, and with no recollection of anything after her attempt to reach the bathroom. She suffered from malaise and muscular weakness for about ten days.

LOCALISED INJURY INVOLVING THE AUDITORY WORD CENTRE.

J. B., a quarryman, aged 36, when firing a shot, was struck on the head by a small fragment of stone travelling with great velocity. He received a small wound just above the posterior third of the left zigoma, and was rendered unconscious. The skull was fractured, and some small pieces of bone were driven into the brain. These, with some pulped brain substance, were removed from the position of the superior temporo-sphenoidal gyras. After some days, consciousness returned, and in a fortnight recovery appeared complete. It was then, however, noticed that the power to name objects was almost completely lost. A pen he called "something to

write with," a watch "something to tell the time with." On being pressed to name the latter he called it a "pot brace." He could not tell the names of his intimate friends.

Names expressing quality he was able to give, and correctly named the colours of different objects though unable to name the objects themselves. During the next eighteen months, he gradually regained the power to name ordinary objects, but the names of unusual things still puzzle him, neither can he recall the names of friends, whom he only sees occasionally. For the first year he had, at intervals, attacks, during which he felt giddy and ill, and was unable for a time to name even the more common objects. These have now ceased.

This case is an interesting "accidental experiment," confirming the present views as to the position of the auditory word centre in the superior temporal convolution. It also shows that the restoration of function was by learning afresh, in which process the right hemisphere probably took part. The "attacks" might be compared to Jacksonian epilepsy.

NOTES FROM FOREIGN JOURNALS.

SUPRA-RENAL EXTRACT IN NEURALGIA AND NEURITIS.

CARLETON, in *American Medicine* of February 24, gives a series of remarkable results obtained by the local application of adrenalin. His first case was one of neuralgia of the left infra-orbital nerve, the whole course of which was red and œdematous, with shooting pains in the supra-orbital, maxillary, and temporo-facial nerves. The patient, an actress, had suffered from similar attacks twice a month for some years. Morphia gave temporary relief, and large doses of acetanilide "lessened the throbbing." The latter effect led Carleton to apply adrenalin locally, in order to reduce the local hyperæmia, and thus to secure temporary relief. He applied about 15 drops along the course of the infra-orbital. Pain ceased in just over three minutes, and throbbing in another minute, whereupon the patient went off to sleep, and woke, five hours later, quite free from pain. Three months later she reported that she had only had very slight returns of the pain.

His second case had neuritis of the terminal nerves in the palms and soles, with small red nodes, which were acutely painful. Each spot was touched with a drop of 1 in 2,000 solution of adrenalin chloride, and in five minutes all pain was gone.

Several cases of neuralgia affecting the infra-orbital, or supra-orbital nerve, were treated; in some of which there was local œdema, and others were accompanied by shooting pains in the molar, dental, or temporo-facial branches. All yielded to adrenalin within four minutes. For the later cases, about one minim of adrenalin ointment (1 in 1,000) was used, being easier to apply. The application was made along the course of the nerve, where the pain was greatest; branches, painful through sympathy, needed no application.

In a case of sciatica, in which each attack began mildly and gradually increased to great severity, 2 m. of the ointment were applied along the course of the nerve. No pain remained after six minutes. Although there had been many previous attacks there was no recurrence in three months.

In cases of temporo-facial neuralgia, the ointment is applied, beginning at the junction of the temporo-facial and molar areas, where the pain is most acute, and continued along the course of the supra-orbital.

Every care was taken to avoid any possibility of hypnotic suggestion causing or aiding application, and, in the case reported last in the series, test applications of vaseline were made unknown to the patient, with the result that only the painful spots treated with the adrenalin ointment were relieved. The case was one of general neurasthenia of three years' duration, with partial paraplegia, aphonia, and great prostration. Along the spine, in the lumbar region, were three painful nodes, to one of which adrenalin ointment was applied, and plain vaseline to the others. The pain only disappeared in the latter after adrenalin ointment had been applied. There was no recurrence of the pain, and the patient began to sleep well, to gain flesh and strength, while voice and appetite returned. (*Therapeutic Gazette* July.)

MENTHOL.

In the same work are given several prescriptions for the use of menthol which substance is now largely employed for its local therapeutic effects.

1. For fumigating the rooms of phthisical patients:—

℞. Menthol - - - - - - ʒi.
Creosoti - - - - - - ʒij.
Ol. Terebinthinal - - - - - ʒiv.
Liq. Formaldehyd. - - - ad ʒij.
Misce.

"Empty half a teaspoonful on to a red-hot shovel."

2. For inhalations:—

℞. Menthol - - - - - - ʒj.
Ol. Pini,
Terpinol,
Eucalyptol - - - - - āā ʒss. M.

"Ten or twelve drops on a tampon of wool for frequent inhalations."

℞. Menthol.
Eucalyptol - - - - - āā gr. xv.
Sp. Lavandulæ,
Liq. Thymi - - āā ʒiss.
Tinct. Tolut. - - - - - - ʒiij.
Sp. Vini Rect. - - - - ad ʒiv. M.

"One teaspoonful to be used in an inhaler with boiling water."

For use in acute catarrhal laryngitis, bronchitis, and lung affections, coryza, *et hoc genus omne.*

3. For local anæsthesia:—

℞. Menthol.
Acid. Carbolic. pur. } partes æquales.
Cocain. Hydrochlor. }

For painting the pharynx, local anæsthesia in the reflex cough of tubercular patients, dysphagia in laryngeal phthisis, or decayed teeth.

℞. Menthol - - - - - - gr. iij.
Sp. Mellissæ - - - - - ʒi.
Aq. Chloroformi - - - - - ʒiv.
Aq. Tilæ - - - - - ad ʒx.
M. Ft. Mist. - - - - - capiat ʒfs. omn. hor.

TREATMENT OF SEA-SICKNESS AND CARRIAGE-SICKNESS.

Bardet compares with sea-sickness, the complaint which seizes some people when they travel in a horse-drawn or railway carriage, and thinks that these conditions should be treated in the way to which he has drawn attention in *Nouveaux Remèdes.* He considers that the condition of migraine and giddiness, which constitutes this trouble, is decidedly analogous to the paroxysmal crisis of hyperchlorhydria, and he has proved that the vomit is actually hyperacid. He treats the complaint as an attack of hyperchlorhydric dyspepsia, combining with the drugs, suitable for that purpose, another which acts as a local anæsthetic and anodyne, and obtains the latter effects by using the valerianate of menthol, known as validol.

Accordingly, he has modified Albert Robin's prescription for hyperchlorhydria, and added validol to it, thus:—

℞. Picrotoxin,
Morphiæ Hydrochlor. - - - āā gr. j.
Atropiæ Sulphat. - - - - - gr. ½.
Validol. - - - - - - ʒiiss.
M. Ft. pulv.

This is dissolved in 8 ozs. of white Curaçoa, so that each teaspoonful of the liqueur contains $\frac{1}{10}$th of a grain each of picrotoxin and morphia, and $\frac{1}{200}$th of a grain of sulphate of atropia. One teaspoonful should be taken at once, and repeated every hour if necessary. The maximum dose *pro die* is 4 teaspoonfuls.

The full treatment is, that, as soon as the patient sets out on his journey, he should take one of Robin's "saturation" powders (carbonate of lime, hydrated magnesia, and submitrate of bismuth) stirred up in about two ounces of water, to which is to be added one teaspoonful of the above liqueur, and the dose may be repeated every hour, or every time the sickness comes on, within the limit mentioned. (*Journal de Médecine et de Chirurgie.*)

A NEW AND CERTAIN METHOD OF EPILATION.

Kromayer describes, in the *Deutsche med. Wochenschr.*, his new method of epilation, which is of unfailing effect. The principle of the method consists in the complete removal, by means of fine cylindrical knives or punches, of the hair-shaft, together with the root-sheath and papilla, and thus preventing the regrowth of the hair, as the parts from which this proceeds are cut out of the skin. The punch is set rotating rapidly by means of a foot machine or a motor, and is then pressed against the skin enclosing the hair. It sinks in almost painlessly, and is drawn out again, carrying within it the essential parts of the hair. The diameter of the cylinder is so narrow that very little bleeding results, and there is practically no scar. The hair may be made more visible by previous staining with henna and reneg, the oriental hair-dyes. Kromayer believes that this method will be found to offer such great great advantages over all others, that it will be used by everyone who wishes to obtain the best cosmetic results. He also uses the same method for the treatment of acne. (*Therapeutische Monatshefte.*)

PROPHYLAXIS AND TREATMENT OF BALDNESS.

Lassar believes that methods of treatment will improve to such an extent that baldness will become a rarity. He has no belief in the influence of intellectual work upon the falling out of hair, and gives several instances of savants who have preserved into extreme old age their luxuriant chevelure. All loss of hair is abnormal, and the popular belief in a physiological defluvium is false, as is also the idea that frequent washing of the head is harmful. On the contrary, frequent washings and soapings are the best prophylaxis of baldness.

The antiseptic treatment praised by the author has scarcely changed in the course of some years. The head must be washed every day with soap and warm water at first. After a time a mild tar-soap must be used. When this is done the hair must be damped with sublimate solution $1°/_{oo}$, and if

there is any irritation 2°/₀₀ carbolic acid should be added. As soon as the water has evaporated one of the following must be well rubbed in:—

℞. Thymol. - - - - - - gr. viij.
Sp. Vini Rect. - - - - - ʒviij. M.

or ℞. Naphthol. B. - - - - - gr. viij.
Sp. Vini Rect. - - - - - ʒviij. M.

After this the following mixture is applied:—

℞. Acid. Salicylic - - - - - gr. xv.
Tinct. Benzoin. - - - - - ʒss.
Ess. Bergamot. - - - - - ♏xv.
Ol. Olivæ v.
Paraffin. Mollis (Flavæ) - - - - ad ʒij. M.
"For external use." (*Deutsche med. Wochenschr.*)

THE EFFECTS OF EXTRACT OF COTTON-SEEDS UPON LACTATION.

Professor Gilbert, at the Académie de Médecine on March 20, reported the results of 58 analyses of breast-milk, carried out by Barlerin at the Belleville Dispensary. The milk in each case had become insufficient, and the mothers were given the extract of cotton-seeds to take. In every case the analysis showed that an undeniable improvement was produced.

This communication has a most important bearing upon the question of infantile mortality, as it raises the hope that, when the use of the remedy becomes widely adopted, a notable decrease may be obtained from the present high figures. It must, however, be remembered that milk, which is too rich in casein, and especially in fats, is a danger to the child, for it may set up gastric and intestinal disturbances and their consequences. The extract of cotton-seeds is, therefore, an agent, which must not be used, except under guidance, and with due method. The practitioner must always watch its effects, and, judging by the effects upon the weight and general condition of the child, as determined by frequent examinations, graduate, or even stop its administration, as soon as the good effect has been produced. (*Revue de Thérapeutique.*)

A SYMPTOM OF TABES.

Prof. Orchansky points out that when a healthy man is lying on his back with his legs extended, it is scarcely possible to lift the foot from the level of the bed, if the knee is firmly held down; in tabetics, on the contrary, the leg can be made to assume a position of over-extension, forming with the level of the bed an angle of 15° to 20°. The same symptom, though not to the same degree, is also to be found in cases of chronic myelitis with atrophy, or muscular weakness, and loss of the tendon reflexes, but it cannot, as a rule, be obtained when spasmodic affections are present. It is, however, nearly constant in infantile paralysis of the common hemiplegic type and in advanced rickets.

In tabetics, the symptom is seldom present to the same degree in each limb, just as the ataxic disturbances are not equally present, but the greater the amount of motor incoördination the more apparent becomes the angle of over-extension at the level of the knee.

This symptom is in no way connected with lightning pains, anæsthesia or paræsthesia, but is usually accompanied by certain other morbid

symptoms affecting the knee-joint. When the thigh is fixed, the leg can now and then be drawn outwards so as to form an obtuse angle with the outer side of the knee. The patella itself is particularly movable, and can be displaced in all directions, while it can be raised up sufficiently to allow a finger being placed between it and the articular surfaces of the femur and tibia.

Similar symptoms, connected with the relaxed condition of the ligaments, can be obtained just as well in other joints, especially of the elbow and the foot, but not to the same extent as in the knee.

This angle of extension has its therapeutic interest, for the ligamentary relaxation is no doubt a factor in the ataxic troubles. Acting on this idea, Onchansky orders for his tabetic patients a wide rubber band to go over the knee. This, by grasping the joint firmly, gives the patient more assurance and more stability in walking, and so adds materially to his comfort. (*La Quinzaine Médicale.*)

ANÆSTHESIANA.

Dawbarn brings forward, in the *Journal of the American Medical Association*, some practical points which are of general interest. One refers to giving chloroform at night in the presence of a naked flame. After a time nascent chlorine will be set free from the chloroform vapour, and give rise to bronchial irritation and coughing amongst those present in the room. The author recommends the plan, which he adopted some years back, of hanging up near the light handkerchiefs moistened with ammonia, with the result that ammonium chloride is formed at once, and the room is freed from the irritant gas.

Another point is that, when giving chloroform to young children, a time should be selected, if choice is possible, which is the usual hour for their daily sleep. The administration should be begun cautiously, so as not to waken the child, and continued slowly and gradually, using a mask and drop-bottle. If successful, the amount of chloroform required is very small, and there is no struggling with a frightened screaming child.

The third point calls in question the usual advice that all false teeth must be removed from the patient's mouth. The author regards, as exceptions to this general rule, patients who wear a complete or nearly complete set of teeth. Thus, if dislodged, is not likely to be swallowed, while its removal from the mouth allows the lips and cheeks to fall in, and thus greatly diminish the breathing space inside the mouth. Administration is then difficult, and, as nasal obstruction is often nearly complete and by no means infrequent, it may constitute a positive danger.

Reviews of Books.

The Real Triumph of Japan, the Conquest of the Silent Foe. By Louis Livingston Seaman, M.D., LL.D., late Surgeon-Major U.S.V.E. Pp. 291. London: Sidney Appleton. 6s. net.

Few books that have been published in connection with the late Russo-Japanese War possess so much interesting matter, and are so replete with information and with food for reflection as the one before us. The industry, versatility, and enterprise of the Japanese have in many ways astonished the civilised word, but we are safe in saying that these qualities have never been more signally displayed than in the extraordinary development of medical science and sanitation as shown by Dr. Seaman. The history of previous wars has demonstrated that, in prolonged campaigns, of every 100 deaths that have occurred, 20 have been due to conflict with the open enemy, while 80 have resulted from the secret enemy, disease. In her previous wars, Japan saw her navy practically prostrate with beriberi or kakké, and her army sadly decimated by contagious disease. Her enlightened medical men saw that, to be successful in a war with one of the great modern nations, she must limit preventable disease in her army and navy, and that her soldiers must be on the firing line rather than in hospitals, and successfully impressed this view upon her statesmen. With a population of less than 50,000,000, she realised the hopelessness of the outcome of a war with any of the great Western nations unless every possible precaution was taken, and every available resource was utilised. The outcome of this is laconically told in two lines:—

"The Sons of Nippon have set a new standard: four men killed by bullets to one who dies from disease!"

How this marvellous change was accomplished is graphically told in Dr. Seaman's little book. It is difficult to realise this, for in our own recent war in South Africa, the ratio of deaths from wounds to those from disease was 1:4; in the late Japanese War it was 4:1; while the success of their treatment in hospitals was so great that 40,000 Japs recovered and returned to the field of battle. The book is illustrated with 31 full-page photographs of a very interesting character, and we earnestly commend it, not only to all members of the profession in our army and navy, but also to statesmen of both parties who control the affairs in the sister services, and who may possibly find some hints for an improved system of administration in it.

Diseases of the Anus and Rectum. By D. H. Goodsall, Senior Surgeon to the Metropolitan Hospital, and W. Ernest Miles, Surgeon to the Gordon Hospital, and to the Cancer Hospital, Brompton. Part II. London: Longmans, Green & Co. 8vo. Pp. 271; pp. 22. 44 illustrations. 6s. net.

This book, which forms the second part of the authors' treatise on the Anus and Rectum, is devoted to the consideration of the various types of ulceration of the Rectum with their sequelæ, and to tumours, stricture and prolapse of this portion of the alimentary canal. A final chapter contains a list of foreign bodies that have been discovered in the rectum.

There is an interesting section upon contagious ulceration of the ano-rectal region, with the result of bacteriological examination by Klein and Sims Woodhead. The authors give an account of several epidemics of this condition, which have occurred especially in hospitals where the sanitary conditions have been imperfect. They consider that it can also be contracted under insanitary conditions out of hospital, and lay great stress upon the necessity of obtaining complete cicatrisation of wounds in the ano-rectal region, before the patient is allowed to go home. The treatment of malignant disease is fully discussed, the authors being in favour of preliminary colostomy as a routine procedure. The work forms a useful handbook of diseases of this important region, and its value is greatly enhanced by the excellent type and illustrations.

Lectures on Clinical Surgery. By H. C. Hinder, M.B., M.Ch., Honorary Surgeon, Royal Prince Alfred Hospital; Joint Lecturer on Clinical Surgery, University of Sydney. Pp. 286. Illustrations 50. Demy 8vo. London: Bailliere, Tindall and Cox. 12s. 6d. net.

This is a series of lectures of which all but one are on subjects connected with genito-urinary disease. They form an interesting collection, which includes such subjects as stricture of the urethra, conservatism in renal surgery, and suppression of urine. Without going deeply into any of the subjects, the author clearly gives sufficient information, illustrated by case records, to impart a practical knowledge of each of the ten themes that he discusses. The illustrations, of which several are coloured, are of varying merit. The book is addressed to the students who attended the lectures, but it will doubtless find a wider constituency.

Treatise on Orthopedic Surgery. By Edward H. Bradford, M.D., Professor of Orthopedic Surgery, Harvard Medical School, Surgeon to the Boston Children's Hospital; and Robert W. Lovett, M.D., Assistant in Orthopedic Surgery, Harvard Medical School, and Assistant Surgeon to the Boston Children's Hospital. Pp. 655. Engravings 592. London: Baillière, Tindall and Cox.

We welcome the appearance of this, the third edition of Drs. Bradford and Lovett's well-known work. Since the appearance of the second edition six years have elapsed, and much new work has been done, more especially in the United States and in Germany, on the subjects of congenital dislocation of the hip, of traumatic and non-traumatic coxa vara, and of non-tuberculous diseases of the joints. An excellent feature of this edition is the chapter giving practical details of apparatus used in orthopedic surgery. We approve of the plan on which the subject-matter is arranged. So far as possible, the grouping is causative rather than symptomatic. Thus the tubercular diseases of the bones and joints are dealt with in the first five chapters. Then follow infectious osteomyelitis, synovitis, and arthritis, and arthritis deformans. Rickets, knock-knee, bow-legs, coxa vara, and vulga are described in Chapters VIII., IX., and X. Lateral curvature of the spine occupies Chapter XI., a long chapter, but most instructive, and full of experimental and practical details. Scoliosis, or, as the authors prefer to call it, lateral curvature of the spine, is often the despair of the surgeon, and it will continue to be so until we can arrive at an exact estimation of the causative factors. The experiments of one of the

authors are throwing much light upon this vexed question, and are being followed with keen interest by many workers. Anterior poliomyelitis, with its pathology, ætiology, symptoms, and resulting deformities, is fully discussed, and the recent methods of tendon transplantation and nerve grafting are detailed. Spastic and other forms of paralysis come in for adequate attention in Chapter XV. Then follow functional affections of joints, unilateral atrophy and hypertrophy, congenital dislocations, talipes and flat foot, and other affections of the foot.

We have thus given an outline of the general plan of the work, but to go into detail is beyond the limits of this notice. However, where there is so much to admire and praise, it would be invidious to select minor matters for criticism. No effort has been spared to render the work complete, and the authors' personal experience is unobtrusively impressed on each section and chapter, while at the same time they have done ample justice to the views of other workers in the same field by giving full references when necessary. This is a volume of great practical value both to the surgeon and to the student.

Supplementary Essays on the Cause and Prevention of Dental Caries. By J. Sim Wallace, M.D., D.Sc., L.D.S., Honorary Dental Surgeon to the West End Hospital for Nervous Diseases, and Assistant Dental Surgeon to the National Dental Hospital. Pp. 81. Demy 8vo. London: Baillière, Tindall and Cox. 2s. 6d. net.

In this little volume of collected essays Dr. Wallace upholds the opinions which he expressed six years ago under the title of *The Cause and Prevention of Decay in Teeth*. Briefly, Dr. Wallace believes that the chief cause of dental caries is the insufficient mastication of improper food, that is to say, food which has been rendered pappy by the removal of the greater part of its harder constituents. Contributing to the result we have antiseptic mouth washes and dentifrices, and excessive use of the tooth-brush. Proper mastication, harder food, and restriction of the amount of fluids ingested during meals are the remedies suggested. Dr. Wallace argues his point well, and his conclusions, though evidently not those of the dental world in general, seem thoroughly plausible.

The Food Factor in Disease: being an Investigation into the humoral causation, meaning, mechanism, and rational treatment, preventive and curative, of the paroxysmal neuroses (migraine, asthma, angina pectoris, epilepsy, etc.), bilious attacks, gout, catarrhal, and other affections, high blood-pressure, circulatory, renal, and other degenerations. By Francis Hare, M.D., late Consulting Physician to the Brisbane General Hospital, Inspector-General of Hospitals for Queensland, etc. Two Vols. Pp. xiv and 497; viii and 535. London: Longmans, Green & Co.

The portentous length adopted in the title of this work is fully maintained in the substance of the book itself, for the main thesis is developed in most ample fashion with a great deal of recapitulation. Each chapter has its summary, and the references are innumerable and mostly verbatim.

We cannot but think that the author made a somewhat unhappy selection in quoting Buckle as an authority on the relative value of inductive and deductive reasoning to science. In his zeal to raise the character of

deduction, the author falls foul of what he calls "inadequately aided induction," saying that this "is now unduly hampering progress." It is, of course, mainly owing to the invention of verifiable hypotheses, which often start from a slender basis, that every great step forward has been made, but each of these has had to submit to the test of extended observation. The invention of hypotheses has, therefore, always been more attractive because it escapes the drudgery of observation and experiment, and herein lies the danger. Moreover, having no definite bounds, like a hard-and-fast fact, a hypothesis is extremely adaptable, and so can easily be fitted in with facts as observed.

In putting forth his theory of pyræmia, the author attempts an "anticipation of Nature," and his mass of corroborative detail certainly gives an air of verisimilitude to his narrative. There must have been an infinite expenditure of time and trouble devoted to the mere production of such a work. So much is still to be learnt as to the facts, that it is impossible to say whether the theory can be verified or whether it is unverifiable. In the meantime, it remains to be seen whether the ideas amount to a real working hypothesis. Of this we are at present more than a little doubtful.

Mucomembranous Enteritis. By PAUL FROUSSARD, M.D. ["Ancien Interne" of the Hospitals of Paris; Consulting Physician at Plombières-les-Bains. Edited by Dr. EDWARD BLAKE, Pp. 66. London: H. J. Glaisher. 2s. 6d. net.

THIS disease, with the long name inscribed above, is defined as a chronic affection of the intestine, occurring in "neuro-arthritic subjects in consequence of some excitation of the various intestinal nerve-centres." It is not "a pathological entity—only a syndrome revealing the presence of some mortio excitation of the intestinal tract." Neither is it "a neuro-arthritic stigma." There is still much to be learnt as to the precise pathological anatomy, owing to "the meagreness of preexisting documents." We read of "gastric hyperesthenia" and "hyposthenia" of "dynamic atony," and that constipation may be total, qualitative, quantitative, or horary. Dr. Blake calls it a "classic treatise." It would be more comprehensible if there were less classic and more treatise.

Annual Report on the Advancements of Pharmaceutical Chemistry and Therapeutics. London: E. Merck.

THIS Report, which has now reached the nineteenth issue, is the outcome of a desire to furnish a brief and impartial review of the therapeutic acquisitions of the last twelve months. It forms an admirable book of reference, for the preparations, of which a full descriptive account of each is given, are arranged in alphabetical order, and practitioners are informed that the volume, which comprises 260 pages, may be obtained, free of cost, on application to the London office.

Artificial Limbs for Use after Amputations and Congenital Deficiencies. By F. GUSTAV ERNST. 117 illustrations. Leicester: F. W. S. Clarke.

THIS is a beautifully printed and produced book, and contains much valuable information with regard to artificial limbs. Mr. Ernst is probably without a peer in this subject, so that any information from his pen naturally commands consideration. Readers of THE PRACTITIONER would be well advised to obtain a copy, and its careful study would be amply repaid.

Notes by the Way.

The Introductory Addresses.

THE introductory addresses delivered at the opening of the medical schools this year had, as a whole, a much more businesslike character than usual. There was less of the vague eloquence that, like a particular kind of sermon referred to by Whately, "aims at nothing—and hits it"; and there was little of the "Be virtuous and you will be happy" type of homily. But the most significant feature was the almost complete absence of the customary well-meant endeavours to paint the lot of those who adopt medicine as a profession in the most roseate hues. The men generally chosen to deliver these addresses have, for the most part, little or no personal experience of the life of a general practitioner; but their daily paper, if nothing else, must have taught them that at the present time insistence on the attractions of a medical career would have brought down on any orator, bold enough to dare such a flight of fancy, a shower of ridicule from the profession that would have made him cut as sorry a figure as the Jackdaw of Rheims under the Archiepiscopal curse.

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The State of the Medical Profession.

ASSUREDLY the state of the profession as reflected in the lay press is far from satisfactory. Making due allowance for the journalistic exigencies of the silly season, it is remarkable that the "bitter cry" of the "ruined doctor" has made itself heard in so many different quarters. In the complaints themselves there is nothing novel; what is new is the amount of space which newspapers of the widest circulation have allowed for their utterances. We should like to believe that this may be taken as a proof that it is coming to be recognised, by those who mould opinion, that the condition of the medical profession is a matter which closely concerns the public. A cry has been raised about the "scarcity of doctors." There is, as far as we know, no ground for thinking that there is any dearth of doctors, although the five years' curriculum and the increased

expense of professional education have naturally tended to diminish the output in recent years. But there can be no doubt that, if the prospects offered by the profession of medicine cease to attract aspirants of the kind best fitted for the work, not only individual members of the public, but the community at large must inevitably suffer.

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The Causes of Our Discontent.

THE causes of discontent are painfully familiar, and to those whose own withers are unwrung have become wearisome from iteration. They may all be summed up in the proposition that it is becoming more and more difficult to make a decent living by the lawful exercise of the art of healing. If we seek to discover what it is that makes the struggle for life so hard, we find this variously attributed to overcrowding of the profession, leading to bitter competition and underselling; to the grinding tyranny of clubs; to the abuse of hospitals; to the general use of patent medicines; to poaching on medical preserves by the prescribing chemist; to the prevalence of quackery, naked and unashamed; to the foolish generosity of doctors themselves, who give for nothing advice which the public values in proportion to its cost, and to the fact that the profession, by diffusing a knowledge of the laws of health, has made people to a large extent independent of its help. All this tends to take the bread out of the doctor's mouth and to drive him to shady practices.

Want of space will not allow us to discuss these causes in detail; we can only touch lightly on them and invite our readers to discuss them more thoroughly.

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Overcrowding.

IT may be pointed out that overcrowding, if it exists, tends to remedy itself by the operation of the causes which, as already said, are lessening the number who enter the medical schools. It is alleged that the low standard of preliminary education is responsible for overcrowding. This we take leave to doubt, and in any case the suggested remedy of guarding the portals of the profession more strictly would probably be found impracticable. The city of medicine cannot be

made a close borough, and any attempt in this direction would, we are sure, result in a failure that would discredit the profession.

* * *

Clubs.

With regard to clubs, the remedy is in our own hands. The sweating of doctors by these organisations would cease of itself if no one could be found to do the work they offer. Until the profession combines effectively for the protection of its own interests, friendly societies will naturally take advantage of our divisions, and needy practitioners will be found willing to be their servants. It is useless to look elsewhere for help. "Blacklegs" do not break the law, and do not as such come within the jurisdiction of the General Medical Council. Nor would it be politic, in our opinion, for the Council to seek for an extension of its powers in this direction. Public opinion has to be reckoned with, and an attitude that would seem to show that the profession put its own interest in the first place, and those of poor people in the second, would not increase its popularity. As Disraeli said to voters, "Register, register, register!" we say to our brethren, Combine, combine, combine!

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Patent Medicines.

Of the abuse of patent medicines, it may be said that, while apparently helping people to dispense with medical advice at the time, it in the long run compels them to take counsel of the doctor. It need not be pointed out in a professional journal to what an extent the habit of self-drugging tends to produce various forms of mischief, but it may be urged that the habit engenders a mental condition which makes its victims prone to imagine bodily ill when there is none. It is true, of course, that the profession, in its efforts to abolish disease, is working to its own undoing, and that certain scourges, which used to be a profitable source of income to our predecessors, have been so far mitigated as to yield little to the doctor of the present day. It will be remembered that in the August 1905 issue of THE PRACTITIONER, a general practitioner was quoted as saying "There's not enough acute disease to go round." As we then

said, the art of healing must necessarily become superfluous when there is nothing to heal. The millennium of health is still, however, sufficiently far off to make it unnecessary for us to trouble seriously about the event.

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The Prescribing Chemist.

We do not think the prescribing chemist does us much harm, and in any case it is useless to grumble about him. The law cannot touch him, for in this free, enlightened country anyone, so long as he does not give himself out to be a properly qualified doctor, is at liberty to prescribe. Of course it is utterly wrong that a man who knows nothing of the structure and functions of the human body, or of the processes of disease, should undertake the treatment of symptoms of which he cannot understand the significance. But till a hard-and-fast line is drawn between the prescriber of drugs and the vendor of them, it is useless to complain of the chemist for trespassing on the domain of the physician. The remedy for the evil of counter-prescribing, such as it is, is the enlightenment of the public mind in regard to the elementary rules of health. When people understand that diseases are not an assortment of things distinctly labelled, each with its corresponding drug, they will know the difference between the medical practitioner and the chemist. This difference is neatly set forth in the following story, related by a correspondent to the *Standard* :—

"A working man called upon a surgeon for advice and medicine, who, having 'diagnosed' the case, made up a bottle of mixture, and asked half a crown as his fee.

"'Half a crown!' exclaimed the man. 'That is a lot to charge. Why, I suppose there ain't sixpennyworth of stuff in that bottle?' 'Well, no,' answered the doctor, 'I doubt if there is more than twopennyworth of "stuff" in it. But I will tell you what I will do,' he added, 'the next time you want to consult me you pay me sixpence and you shall take your choice from all my bottles,' 'Oh! but,' said the man, 'I should not know which to take.' 'Exactly,' retorted the surgeon, 'and that is why you pay me half a crown!'"

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Quacks.

A MUCH more serious matter is the competition of quacks. This, we fear, is not to be got rid of by Act of Parliament. The belief in quackery is born of human folly, and will continue to exist as long as that endures. In Robert Macaire's immortal saying, "*Tout passe, mais les badauds ne passeront pas!*" In countries like France and Germany, where laws of the most formidable kind exist on paper, quackery is just as rampant as among us. The only remedy is the spread of scientific light among the people. Here we may perhaps be allowed to hint that the profession itself, by making a mystery of the medical art, and by the reticence which it imposes on its members, indirectly does something to prolong the reign of quackery. As with the progress of hygiene its field of operation in the way of treatment is narrowed, its higher function as an apostleship of health should increase. Work in the laboratories and the supervision of sanitary arrangements in the dwelling and in the town are only a part of the functions of the doctor of the future. He must, further, be an active propagator of sound knowledge, and an active preacher of the gospel of health. In this larger sense there is no fear that the doctor's occupation will ever be gone.

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The Tom Tiddler's Ground of Medicine.

IN the meantime there are forms of treatment which the profession, out of a mistaken sense of dignity, or indifference, or sheer ignorance, has allowed to become a Tom Tiddler's ground for unlicensed practitioners. Among these are massage, Swedish exercises, and various applications of electricity. It is now recognised that, properly used, these are all, in their several ways, useful. Even in that evil thing bone-setting there is a spirit of good. Why should these things be left to quacks? They belong essentially to rational medicine, and should be recaptured for its benefit, and for the greater good of the public. John Knox, or some other reformer, is said to have justified his action in borrowing the tunes of love songs for his hymns by the plea, "Why should the devil have the best music?" The moral of this story, as Jack Bunsby would say, lies in the application thereof.

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A Doctor's Trade-Union.

AMONG the remedies that have been suggested for the grievances under which the profession labours, is the organisation of a trade union. This proposal emanates from Dr. A. Curry, L.R.C.P., and S.I., of Camberwell. He proposes to call the organisation, the "National Union of Medical Doctors," or the "National Union of Medical Practitioners." The chief aims of such a union, we gather from the *Daily Express*, would be –

"To protect and further our interests in connection with all legislation affecting us.

"To watch municipal and other local matters in which the profession is interested.

"To obtain equitable remuneration for services both from public and private sources, and to maintain a 'fair wage for fair work," as is demanded by trade unionism.

"To form a benevolent fund for the assistance of poorer medical men."

Dr. Curry states that it is not intended to interfere either with the General Medical Council or with the British Medical Association, the object of which he rather oddly describes as "of an educational and scientific character." He adds that he is convinced that the basis of a union must be political and that we must form an independent party. One cannot help envying the lightheartedness with which Dr. Curry, who is obviously a very young man, enters on his undertaking, but we cannot help feeling that he imperfectly realises the difficulties that lie in his way. In the first place, the British Medical Association, in accordance with its new constitution, is a body closely akin to a trade union, and holds the field in which he proposes to work. In the second place, as may be seen from the example of the same body, it would seem to be almost impossible to get the profession to combine for any purpose whatever. If an association which has been in existence for three-quarters of a century, and which has the prestige of great names, and of much good work accomplished, not only in the furtherance of science, but in the promotion of medical interests, now numbers little more than one-half of the profession of these islands among its members, what chance is there that a new

organisation run on political lines—that is to say, on lines which must inevitably cause division—will succeed any better? Dr. Curry professes to believe that doctors have widespread influence, and that if medical candidates were to stand for Parliament their election would be assured. We respectfully invite him to open his eyes and let his soul be instructed. During the last General Election the British Medical Association, with all the machinery at its command, attempted to influence the return of candidates pledged to support medical interests. What was the result? Absolutely *nil*.

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A State-Paid Medical Service.

ANOTHER proposal — which, however, is scarcely intended to be a remedy for medical grievances—comes from Mr. Macpherson, M.P., who would like to see doctors removed from the field of competition, and provided with stipends by the State. As reported by the *Daily Express*, the honourable member went on say: "The doctor should practise his sacred arts (*sic*) not for pounds, shillings and pence, but with a view to making citizens. Many a life has been lost because limitations of the purse prevent the obtaining of the best medical attention. Consequently, the nation suffers. Doctors should not wait to be called. They should be so provided for that they could, and would as a matter of routine duty, drop into schools and oversee the building up of the health of our future citizens." It is a pretty notion that the doctor should practise his sacred art not for sordid pence, but for public ends. But will the State encourage such philanthropy? In ancient Greece, and later under the Roman Empire, practitioners were paid by the State to look after the health of the citizens. The remuneration was such as to enable them to keep up a considerable social position, and public honours were freely bestowed upon them. Will Mr. Macpherson undertake to bring about a return of these *Saturnia regna?* The scheme of a national medical service is by no means new. It was proposed as far back as the seventeenth century, and it has, within the last twenty years, been brought forward again more than once. When socialism comes upon us, but not before, the medical profession will be transformed into a department of the civil service.

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Cancer Research.

SOME years ago THE PRACTITIONER suggested that the problem of cancer should be attacked more systematically than had previously been the case, and that the work done on the subject throughout the research laboratories of the world, should be co-ordinated, every discovery being at once communicated to all investigators, as astronomical discoveries are announced to all observatories. A good deal has been done since then to carry this proposal into effect. The Imperial Cancer Fund has been established, and organisations for the study of the disease have been formed in Germany, the United States, and elsewhere. The other day magnificent new laboratories, with a special hospital, were opened at Heidelberg. The scientific armies, which are marching against this terrible foe of the human race, are well equipped in every way; they are well provided with the sinews of war, the commanding officers are men of tried ability, and the soldiers eager and devoted. It must be confessed, however, that although there has been much beating of drums and huzzaing, so far there is no victory to record. The conference, held at Heidelberg and Frankfort at the end of September, brought no encouraging announcement, and, indeed, did little but reveal various lines of cleavage among the workers. The German Cancer Committee, which began by taking its stand on the parasitic theory, has had to retrace its steps, and, it is whispered, the light of the Imperial countenance shines upon it no more. Pathologists stand aloof watching the fray between those who still advocate the doctrine of parasitism and those who look for a solution of the mystery in the transplantation of tumours into mice. Meanwhile, M. Doyen sticks gallantly to his somewhat discredited *Micrococcus neoformans*, as though he would say with Touchstone: "An ill-favoured thing, but mine own."

To the cynic the situation must be comic; but to the lover of his kind, who looks for some solid return for money lavishly given and for labour unstintedly expended, it breeds thoughts that lie too deep for tears. It must, however, in fairness be remembered that the work is only beginning, and that although little positive has yet been accomplished, there is ground for hope that the next generation may have at its disposal

means of preventing the disease which lies so heavily on the present. In the meantime both the profession and the public would do well to take to heart what Professor Monprofit said in his presidential address to the Congress of the French Surgical Association recently held in Paris. Speaking of delay in operating for cancer, he complained that patients seldom come to the surgeon before the time is past for really useful intervention. As soon, said he, as the case has become inoperable, as soon as the tumour has largely invaded the neighbouring territory, as soon as the infection has spread to the whole lymphatic apparatus, then an irresistible force, or counsel which is not always disinterested or devoid of a jeering scepticism, pushes the patient towards us in such a manner that we often do not know what useful advice to give to those unhappy victims of prolonged temporising. He holds strongly that, in such circumstances, surgeons are bound not to compromise the art of surgery by intervention which may be held accountable for the fatal result. The obvious conclusion is that, if we are to deal effectively with cancer, operation must be done early. But in order that this may be done, it is necessary that the nature of the disease should be recognised at the very beginning. While we are waiting for the discovery of the means of preventing cancer, we must perfect diagnosis to the finest point of accuracy, and then, without what is called "giving the patient a chance," strangle the snake of disease in its cradle.

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Competitions.

THE results of the September Competitions are as follows:—The best essay was sent by Mr. Harold Upcott, F.R.C.S., of Leeds; and the three best cases by Dr. L. T. Biggs, of Strand Town, Belfast. Cheques have accordingly been sent to these gentlemen, and the prize essay and the winning cases will be published in due course.

Practical Notes.

The Tonsils.—The tonsils lie on each side of the isthmus of the fauces between its anterior and posterior pillars, and are situated opposite to the angle of the jaw. On their free surface they are covered by a stratified epithelium, in which are readily seen the orifices of the tonsillar crypts, which dip into the substance of the organ. Into these crypts, the ducts of numerous small mucous glands open. The tonsils are composed of lymphoid tissue, which, besides being diffused throughout the whole organ, is collected at various intervals into small nodules, in which the lymphocytes are closely packed. It is said that, in these lymphoid nodules, the lymphocytes are actively multiplying, and that Karyokinetic figures may be seen in the nuclei of these cells. These nodules are sometimes spoken of as *germ-centres*. According to Stöhr, lymphocytes are found in the epithelium over the tonsils, and they even wander on to the free surface, and are cast off in the saliva, then being known as salivary corpuscles. The outer, or attached surface of the tonsil is enclosed in a fibrous capsule, which is connected with the pharyngeal aponeurosis, outside of which lies the superior constrictor of the pharynx and the internal pterygoid muscle. Immediately above the tonsil is found a variably developed depression, known as the supra-tonsillar fossa, which is sometimes of very considerable size, and which then extends either upwards, or forwards and downwards. This fossa is often the seat of suppurative changes, and is consequently of very considerable importance. According to Cunningham, the supra-tonsillar fossa, like the lateral recess of the pharynx, is the remains of the pharyngeal portion of the second visceral cleft. The palate in its growth backwards crosses the cleft, which it divides into two parts, namely, the pharyngeal recess above, and the supra-tonsillar recess below the soft palate. The arteries of the tonsil are numerous, and are derived from the tonsillar branches and the ascending palatine branch of the facial artery, the ascending pharyngeal branch of the external carotid, the dorsalis linguæ

branch of the lingual, and the descending palatine branch of the internal maxillary. The severe hæmorrhage, which sometimes follows the excision of an enlarged tonsil, comes from one of the above-mentioned arteries. According to Merkel, the internal carotid artery is placed 1·5 cm. behind the outer margin of the tonsil, which is separated from the superior constrictor muscle by a quantity of loose areolar tissue, so that the tonsil may be grasped with a volsellum, and pulled forward without dragging this vessel with it. Hæmorrhage from the tonsil can be arrested by pressing the bleeding point, or points, outwards against the internal pterygoid muscle and the ramus of the lower jaw. The tonsillar lymphatics are received by the lymphatic glands, which are situated near the tip of the great cornu of the hyoid bone, and these glands are affected in septic and tuberculous lesions of the tonsil. The sensory nerve supply of the tonsil is derived from the glosso-pharyngeal nerve, which runs downwards and forwards just external to it.

Tuberculous Disease of the Tonsils.—In a paper entitled "The Channels of Infection in Tuberculosis," Professor G. Sims Woodhead, after reviewing the various ways in which the tubercle bacillus may gain an entrance into the body, writes, "I am driven to the conclusion that this method of infection of the glands of the neck through the tonsils must be a comparatively frequent occurrence, especially in children, living under insanitary conditions, and subjected to various devitalising influences." Dr. Hugh Walsham, in his book, *The Channels of Infection in Tuberculosis*, after repeated and prolonged post-mortem examinations, draws the following conclusions:—(1) That the tonsils, instead of being almost immune from tuberculous disease, are very frequently affected. (2) That tubercle may be primary in the tonsil. (3) That the tonsils are very frequently affected secondarily in persons suffering from chronic pulmonary tuberculosis. (4) That, when the tonsils are tuberculous, the cervical glands, receiving the lymphatics from these organs, are also frequently affected with tubercle. (5) That the follicular glands at the base of the tongue are occasionally tuberculous. (6) That the tonsils may

be affected from without, or through the blood stream, in acute miliary tuberculosis.

Acute Follicular Tonsillitis.—This condition occurs most frequently in young persons, and frequently follows the depressing influences of exposure to cold and wet, or bad air from defective drains, or prolonged work in hospital wards. The tonsils and the adjacent lymphoid do, no doubt, act as a ready entry for micro-organisms of many affections besides acute rheumatism, and acute tonsillitis may be a precursor of chorea, erythema nodosum, and endocarditis. The commonest organisms, found in the crypts of the tonsil, are streptococci and staphylococci. In children and young adults, quite early in the disease, a purge should be given; children will quite readily take one grain of calomel mixed with two or three grains of sugar, and this may be washed down with two tablespoonfuls of fluid magnesia flavoured with orange or lemon. A saline purge is best for young adults. After the preliminary purge, the following mixture may be given to a child between five and ten years of age:—

R.	Tincturæ Aconiti - - -	♏i.
	Liquoris Ammonii Acetatis - - -	ʒi.
	Syrupi Aurantii - - - -	♏xx.
	Aq. Dest. - - - - -	ad ʒss.

Misce Ft. Mistura.

One tablespoonful to be given every three hours for six doses.

Mistura Guaiaci, in one ounce doses, should be given to adults every four hours. If the patient has the early symptoms of acute rheumatism, the following mixture will be found useful:—

R.	Acidi Salicylici - - - -	gr. x.
	Sodii Bicarbonatis - - - -	gr. x.
	Glycerini - - - -	ʒss.
	Aq. Menth. Pip. - - - -	ad ʒi.

Misce Ft. Mist.

Two tablespoonfuls to be taken every three hours, until the patient's temperature begins to fall towards normal.

At night, it is as well to administer a full dose of pulvis pecacuanhæ co.

Locally, the tonsils may be treated with the dry sodium bicarbonate.

During convalescence tonic treatment is required, and one of the following mixtures will be found to be beneficial :—

R. Liquoris Ferri Perchloridi - - - ℥viij.
Tincturæ Nucis Vomicæ - - ℥v.
Acidi Phosphorici diluti - - - ℥v.
Spiritus Chloroformi - - - ℥vj.
Aq. Dest. - - - - ad ℥j.
Misce. Ft. Mist.

Two tablespoonfuls to be taken three times daily after food.

Or,

R. Quininæ Sulphatis - - - - gr. j.
Acidi Sulphurici diluti - - - ℥iij.
Ferri Sulphatis - - - - - gr. j.
Tincturæ Aurantii - - - ℥xx.
Inf. Quassiæ - - - - ad ℥j.
Misce. Ft. Mistura.

Two tablespoonfuls to be taken three times daily after food.

"Quinsy."—Acute parenchymatous tonsillitis may follow the acute follicular tonsillitis ; but, as a rule, the inflammation spreads to the soft palate and the pillars of the fauces. There is extensive local swelling, and much pain and suppuration frequently result. As soon as pus is detected, the tonsil should be freely punctured. This is readily done by using a sharp-pointed bistoury, which should be covered with strapping to within three-quarters of an inch of the point, with the view both of avoiding injury to the lips and of limiting the depth of the incision. The patient's mouth must be widely opened and the tongue depressed, the point of the bistoury must be carried straight back, and the cut made upwards, since the upper part of the gland is, as a rule, most affected.

The following antiseptic gargle, recommended by Schnitzler, may be used after the tonsil has been freely incised, and the pus allowed to escape :—

℞. Sodii Salicylatis - - - - - gr. xl.
Boracis - - - - - gr. xl.
Aquæ Laurocerasi - - - - ʒi.
Aq. Dest. - - - ad ʒviii.
Misce. Ft. gargar.

Alveolar Abscess.—This occurs when caries of a tooth causes pus to form within the alveolus, or tooth socket itself; it occasionally is found in connection with a dental cyst, which forms at the root of the tooth. Should the carious tooth be in the upper jaw, the pus may travel down alongside of the fang of the tooth, around the free border of the bone, make its way through the muco-periosteum on the outer side, and then point as a *gumboil*. On the other hand, the pus may find its way through the bone of the maxilla itself, and travel in one of two directions, either upwards into the maxillary antrum, and cause the condition known as empyema antri, or inwards beneath the muco-periosteum of the palatine process of the maxilla. Caries of the second molar tooth is most likely to involve the antrum, for the fangs of this tooth occasionally actually project through the bony floor of the cavity, and raise the muco-periosteum. Sometimes the roots of the first molar and the second premolar also perforate the antral floor. If the carious tooth is in the lower jaw, the pus may point through the gum near the crown of the tooth, and cause a gumboil, or it may burrow through the bone on the inner side of the mandible, and point in the floor of the mouth between the bone and the side of the tongue. Sometimes, however, it travels on the outer side, piercing the bone directly, or, travelling up alongside of the tooth, it crosses the upper free margin of the bone, rips up the muco-periosteum, and burrows through the substance of the cheek, and then points on the face close to the lower margin of the mandible. A troublesome sinus may result, which can, of course, only be relieved by the removal of the offending tooth. An unsightly depressed scar, adherent to the mandible, as a rule, remains. The treatment consists of extracting the carious tooth in order to

drain the alveolar cavity, and an incision should be made from within the mouth. The knife used must be kept close to the bone, for, unless this is done, there may be some danger of wounding the facial artery, which crosses the mandible at the anterior border of the masseter muscle. In incising an abscess, pointing beneath the muco-periosteum of the hard palate, the presence of the large anterior palatine artery, which lies in close apposition with the inner border of the alveolar process, must be kept in mind, otherwise hæmorrhage from the injured artery may be troublesome and difficult to control. An early incision should be insisted upon, otherwise necrosis of the bone may ensue. After the pus has been evacuated, the mouth should be frequently washed out with a weak antiseptic lotion, or, preferably, with peroxide of hydrogen.

Sweat-Eruptions.—The following treatment, as recommended in *La Clinique infantile*, may be found useful for checking these eruptions in children.

The eruptions usually occur in infants, and look like erythema, very marked on the trunk, more discreet on the face and limbs. When these patches of erythema are very intense, they are highly suggestive of scarlatina, or of eruptions due to digestive troubles; diagnosis from the latter is, at times, a matter of difficulty. These sweat-eruptions are nearly always caused by woollen clothing, giving rise to over-heating. They are much more common in summer, especially among children of the working classes, bound up in thick swaddling clothes.

Treatment is simple when a correct diagnosis has been made. The babies must be clothed more lightly, and wear linen next the skin. About half a pound of starch must be added to the daily hot bath, and the skin or the seat of the eruption must be covered morning and evening with the following:—

℞ Bismuthi Subnitratis - - - - part. i.
Zinci Oxidi - - - - „ iij.
Pulv. Talci (Venetian) - - - „ v.
Misce. Fiat. pulvis.

Recent Preparations and Inventions.

THE "GUNTHORP" ARCH SUPPORT FOR "FLAT-FOOT."

(The O'Connor Extension Co., 2, Bloomsbury Street, W.C.)

In the deformity of "flat-foot" much benefit may, of course, result from the regular performance of certain exercises, which should be prescribed by the medical adviser, but these should be supplemented by some mechanical contrivance, which will keep the foot in the best obtainable position. Such a contrivance is to be found in the "Gunthorp" Patent Arch Support Platform, which is constructed to follow the true lines of the foot, and to combat, in various essential points, the particular degree of deformity in each individual case. Some of the advantages of this "Support" are, that it acts upon both sides of the foot; its spring is a small latero-transverse one, which does not in any way impede the natural action of the joints of the foot or ankle; it has a soft cushion under the whole of the tender ligaments at the base of the sunken arch; it is capable of variations and additions to suit the particular requirements of each individual case; the platform, both at heel and toe, is pliable, thus encouraging the natural movements of the bones. The complete character of this "Gunthorp" Arch Support seems to us to warrant the careful attention of the members of the medical profession.

BOSTEL'S PATENT "NATURAL" WATERCLOSET AND SEAT.

(Messrs. D. T. Bostel & Sons, 71 & 73, Ebury Street, S.W.)

The sitting posture, for the evacuation of the bowels, as necessitated by the watercloset in common use, is not that suggested by nature, nor is it free from certain ills, such as hernia, which result from undue straining at stool. The Bostel "natural" watercloset and seat overcome these defects, and secure the squatting position, which helps to empty the cæcum and ascending colon, and tends to retain the kidney in its normal relationship. This position also serves to displace the sigmoid upwards, and facilitates the evacuation of its

ntnets. The closet is provided with a lift-up seat, and two n rests. These rests are about 2 feet from the floor, the west part of the seat is about 9 inches high, while the front rt of it is 6 inches higher than that, the natural squatting sture for the act of defæcation being thus secured. The ntrivance is in every way admirable.

CYLLIN SYRUP.

eyes' Sanitary Compounds Co., Ltd., 64, Cannon Street, E.C.)

We have before us a new preparation of Cyllin in the rm of Cyllin Syrup, which is especially useful in cases of fantile Diarrhœa. When tested against a vigorous culture of Dysenteriæ, it has a guaranteed coefficient of ·3, *i.e.*, it is ual to 30 per cent. pure Phenol in bactericidal efficiency. ius, in administering 10 m., an equivalent of 3 m. pure henol is obtained, a dose which may, if necessary, be con-lerably increased. The results obtained in the treatment Infantile Diarrhœa with 5 to 10 m. doses are distinctly couraging.

DR. MELZER'S CATHETERPURIN.

(Messrs. Reitmeyer & Co., 63, Crutched Friars, E.C.)

Dr. Leopold Casper, of the Berlin University, speaks of is as a "safe, useful, and aseptic lubricant for catheters stoscopes, etc.," and, on examination, it appears to be all at he claims for it. It consists of glycerine, water, and gum agacanth, rendered sterile by the combination with it of ydrarg. oxycyanate, and is conveniently packed in squeezable ibes ready for use. The application of catheterpurin renders he instruments very smooth, and of easy introduction, while does not irritate the urethra. It does not interfere with the se of the cystoscope, as it dissolves in the water contained the bladder, and leaves the brightness of the mirror untar-ished. Catheterpurin is distinctly useful and, above all, afe.

COMPETITIONS.

We offer our readers every month two Prizes on the conditions stated below.

A Prize of Two Guineas will be given to the author of the best Essay on a subject to be announced by the Editor.

A Prize of One Guinea will be given to the author who submits the best account of three cases, medical, surgical, or obstetrical, taken from the practitioner's own note-book. The style of the accounts, as well as the medical interest of the cases, will be taken into consideration.

The results of the October Competitions will be announced in the December number.

The Subject of the Essay for November will be

The Treatment of Sciatica.

GENERAL CONDITIONS.

A.—All MSS. relating to the Essay must be marked on the top left-hand corner "Essay," and must be sent to the Editor of The Practitioner, 149, Strand, W.C., on or before the 1st day of December 1906.

B.—All MSS. relating to the cases must be marked on the top left-hand corner "Cases," and must be sent to the Editor on or before the 1st day of December, 1906. The matter submitted must not exceed three hundred words for any one case.

C.—No Essay will be returned unless a special request is made, accompanied by a stamped addressed envelope.

A. and B.—(1) One side of the paper only must be written on.

(2) The name, or pseudonym, and address of the competitor must be clearly written on each sheet of paper used.

(3) The decision of the Editor is final.

(4) Competitors must be registered General Practitioners.

(5) The attached Coupon must be filled up by each competitor.

THE PRACTITIONER.

DECEMBER, 1906.

CANCER OF THE STOMACH.[1]

By W. HALE WHITE, M.D., F.R.C.P.,
Physician to Guy's Hospital.

CANCER of the stomach may be said to be a common disease, for I find in the Hospital records that deaths from this complaint account for nearly half of the deaths due to carcinoma. The stomach is the organ most frequently affected by cancer, and, in a period of ten years, 60 patients died in Guy's Hospital from cancer of the stomach, forming a proportion of 1·5 per cent. of the total deaths from all causes.

The case, which I propose to discuss, is a rare example of the disease, but, in discussing it, we shall go over all the most important points in connection with diagnosis and treatment.

A man, aged 30 years, was admitted into the Hospital under my care on August 3rd last, complaining of pain in the stomach, constant sickness, and great weakness. He had not suffered at all from any illness in his life, until Easter of this year, when the pain and sickness first began to trouble him. Six weeks before admission he had been obliged to take to his bed on account of his increasing weakness. He had lost three stones in weight. The pain was referred to the epigastrium, and he was troubled with eructations and a burning sensation in the stomach after taking food. On one occasion, shortly before admission, blood was present in the vomit.

The stomach was found to be dilated, there was a depression below the epigastric angle, and succussion was obtainable. As the patient was young, the case was looked upon as one of gastric ulcer affecting the pyloric region, with consequent dilatation of the viscus, in spite of the fact that there was no previous history of indigestion for any length of time. The idea of cancer was not entertained.

[1] Notes from a clinical lecture delivered at Guy's Hospital.

On the following day, the patient was examined by X-rays, after taking two drachms of carbonate of bismuth suspended in milk. The bismuth was seen to be lying below the level of the umbilicus, thus showing a considerable degree of gastric dilatation. The vomit, examined by Gunzberg's tests and others, showed the presence of an abundant amount of free HCl. This is commonly the case in gastric ulcer, but in carcinoma, on the other hand, there is very great diminution, as a rule complete absence, of HCl in the contents of the stomach.

The patient was transferred to a surgical ward with a view to the performance of a gastro-jejunostomy, an operation which has proved to be the most successful treatment for ulcers and scarring about the pylorus, and gives most satisfactory results, especially when, as in this case, there is dilatation of the stomach. When Mr. Steward opened the abdomen, he found a growth about the size of a duck's egg encircling the pylorus, with outgrowths running from it on to the walls of the stomach, and secondary deposits in the mesenteric glands. One of these was removed for examination, and a posterior jejunostomy performed, as removal of the growth was out of the question. The patient has been able to leave the Hospital relieved of his more urgent symptoms.

It is interesting and instructive to inquire into the reasons which led to a mistaken diagnosis in this case. The first point is the age of the patient, 30 years is very young for carcinoma, while sarcoma, which is the most usual malignant disease at this age, is very rarely met with affecting the stomach. The average age at death of the fatal cases of carcinoma of the stomach occurring in the hospital is 52 years. In the collection of cases, made by Osler and McCrae, only 13 cases of malignant disease of the stomach were found to be recorded in the whole of the medical literature as having occurred in the second decade. My own investigations of the hospital records confirm the rarity of the disease at or under 30 years of age, and only 2·5 per cent. of the cases occur between the ages of 20 and 30. Hence the age of the patient misled us.

The next point, which guided us forcibly to the erroneous diagnosis of ulcer, was the abundance of HCl in the con-

tents of the stomach. This is quite the exception, for HCl is absent, or nearly so, in almost every case of cancer of the stomach. The first to note this absence of HCl in these cases was Dr. Golding-Bird, who was Assistant-Physician to the Hospital from 1843 to 1854, but the fact attracted very little attention until recent years, when a good deal of fresh work has been devoted to examination of the contents of the stomach.

The amount of HCl is diminished in the case of atrophy of the gastric mucous membrane, chronic gastritis, and also when high fever is present, accounting, in the last case, for the poor digestive powers of fever patients, but the diminution is not so great as it is in cancer of the stomach, in which hydrochloric acid is usually only present in normal amounts in quite the first stages of the disease.

This considerable diminution, or even absence of HCl from the gastric juice is, therefore, a great help towards diagnosis. Benjamin Moore, with the help of other workers, has made an extensive series of observations on the presence of HCl in the stomach. They find that the presence of carcinoma in parts of the body, other than the stomach, leads to a great diminution of HCl in the gastric juice. In 15 cases of cancer and 2 of sarcoma (uterus, breast, mouth, tongue, etc.), in none of which was the stomach implicated, HCl was found to be absent, or very largely diminished, when the contents of a test-meal were analysed. In the case showing the highest percentage of HCl, the amount was not equal to one-tenth of the normal quantity. The Gunzberg test showed no reaction in 12 out of the 17 cases, and the highest amount of hydrochloric acid in the remainder was 0·01455 per cent.; the normal being 0·1951 per cent. F. Morton-Palmer, working here in Guy's Hospital, gives in the last number of the *Bio-Chemical Journal* confirmatory observations of his own for cancer cases other than those of the stomach. He also found, in the course of his investigations, that other patients in the surgical wards—one being a case of pyonephrosis, and others, examples of simple stricture of the rectum, chronic mastitis and conjunctivitis—were affected in the same way, but the reduction in these latter was not nearly so great as in the cases of cancer. His results have been

confirmed by B. Moore and others. Adding together Moore's two papers, we have a total of 34 cases of carcinoma situated elsewhere than in the stomach, and 20 other patients not suffering from malignant disease, and, although there was a considerable reduction in the gastric HCl in the 20, there was a still greater reduction in the 34 suffering from cancer. Thus there was an entire absence in the 67·6 per cent. of these cases, and the amount was above 0·05 per cent. in only four; on the other hand, in the non-malignant hospital cases, there was complete absence in only 25 per cent. and the amount lay above 0·05 per cent. in half the cases.

This suggests the question as to whether cancerous growths anywhere in the body secrete something which inhibits the formation of HCl by the gastric glands. If such should actually be the case, it will explain why cancer patients waste so much and so quickly. The fact has always been notorious, but the reason for it has always been a mystery. We know from Starling's observations that there will be no secretion of the vitally important pancreatic juice, unless the contents of the duodenum are acid, for, unless they are, secretin is not formed. If pancreatic digestion does not take place, there must necessarily be a serious loss of nourishment. This, however, is just a suggestion by the way, and it is against it that our patient said he had wasted. The important point established is the very large reduction in the amount of HCl secreted by the stomach in patients suffering from cancer, affecting not only the stomach itself, but any other part of the body. In the largest number of cases, HCl is completely absent; in some a little is found; but in very few is the usual amount present. The case under consideration is quite exceptional, for with him the amount of HCl was found to be abundant, so that a diagnosis of cancer was, considering his age, hardly justifiable; but I notice, in a recent number of the *Clinical Journal*, that Dr. Robert Hutchison alludes to two cases of cancer of the stomach with a considerable amount of hydrochloric acid, and more than one author has suggested that, when in cases of cancer of the stomach free HCl is present, the cancer has originated in a previous ulcer, and therefore our case raises the question—which has been much discussed—whether gastric ulcers lead to cancer.

Gastric ulcers themselves are common, and Welch estimates from a large number of observations, that they are found in 5 per cent. of all autopsies. Sir Cooper Perry and Dr. Shaw, in their analysis of a large number of cases of cancer of the stomach treated in this hospital, state that there was evidence of a simple gastric ulcer in 9 per cent. of the cases of cancer of the stomach, and, as gastric cancer is only found in 1·5 per cent. of all post-mortems, it appears that there is a slight liability for a gastric ulcer to become the seat of cancer. Osler and McCrae, however, do not admit the connection. In the case we are considering, there had been no illness of any sort before Easter of this year, so that probably the carcinoma did not arise in an ulcer. If the question we are discussing is to be settled, it must be by appeal to the post-mortem room, for the bedside diagnosis of gastric ulcer is often wrong.

Sarcomata occur at a much younger age than carcinomata —half the cases being under 25 years old,—so, after the operation, and before the microscopical section was cut, I thought possibly our case would turn out to be one of sarcoma of the stomach. Perry and Shaw found that 8 per cent. of the cases of malignant disease of the stomach were sarcoma. An analysis of some cases, chiefly those published by Dr. Lauriston Shaw, shows that, when it occurs, it is not ulcerated, as a rule, so that hæmatemesis is exceptional, and being a soft non-fibrous growth, and not giving rise to contraction of the pylorus, dilatation of the stomach is not usual, so the symptoms of our case were not those of gastric sarcoma, although his age suggested this diagnosis; but the microscopical examination of the removed gland showed that the growth was a columnar carcinoma. It is interesting here to remember that two of B. Moore's cases of absence, or reduction of gastric hydrochloric acid were sarcoma.

In treatment of these cases of gastric cancer, the chief point is whether it is not possible to adopt more than palliative measures. Gastro-jejunostomy is undoubtedly the most effectual of these, and is especially indicated when the pyloric obstruction leads to vomiting and dilatation of the stomach. The relief of the vomiting and pain, the gain of weight and comfort to the patient may be very great, much suffering is relieved, and life is prolonged. Some of you may remember a

striking instance in a man under my care, about a year ago, upon whom this operation was performed. Mr. Fagge had great difficulty in finding a healthy portion of gastric wall for the purpose, so extensively was the stomach involved. The patient never ceased to be deeply grateful for the comfort and relief afforded him, and he recovered sufficiently to be able to leave the hospital. Complete removal of the growth is always an operation of great difficulty, and demands skilled hands for its performance. Even then the mortality of the operation is between 20 and 30 per cent., probably nearer the higher figure, for I suspect more successful than unsuccessful cases are recorded. Of those that survive the operation, a few, probably rather under 10 per cent., are alive five years and more after the operation, but, as the mortality of the operation itself is so high, there can be little doubt that the life of many is shortened by it, and therefore it is extremely doubtful whether the attempt to remove the growth leads to a total prolongation of life in all the cases. Indeed, I should think that it does not. Further, unless a piece of growth has been submitted to microscopical examination, there is always the possibility, if the patient lives a long while after the operation, that the tumour was inflammatory. The only course to pursue in the presence of the disease is to put the matter plainly and openly before the patient for his decision, pointing out the serious nature of the operation, its difficulty and risks, as well as its possibilities of prolonging life, also telling him that a gastro-jejunostomy itself may prolong life. No one, of course, must attempt the operation unless he is a skilled surgeon.

Early diagnosis is what the surgeons ask for, so as to render the complete operation less difficult in performance and more hopeful in result. The early recognition of the existence of the disease is therefore of the utmost importance, though not easy to compass. The following points are guides. Cancer of the stomach is, as a rule, a disease of the later period of life. The disease is very rare under 30, the age of the youngest patient in Perry and Shaw's collected cases was 32 years, and the patient we have been considering is certainly the youngest in my own experience, although I have seen one other of the same age, but Norman Moore has recorded an undoubted case, aged 13 years. Continuous dyspepsia

beginning in or after middle life should always be looked upon with grave suspicion. This should never be forgotten, for the remembrance of it will often lead to a correct diagnosis of cancer of the stomach. Pain is present in 90 per cent. of the cases, and is of three varieties; there is the pain often between the shoulders or behind the sternum—associated with dyspepsia, the dull, aching pain of cancerous growth, and the dragging pain of a dilated stomach. Pain is an early symptom, but it bears no relation to the size of the growth, the depth of the ulceration, or the extent of surface involved.

If these two symptoms of dyspepsia and pain are present, a test-meal, consisting of dry toast and a cup of weak tea without milk, should be given in the early morning, and siphoned off after an hour and a half. It must be tested for the presence of HCl, and it is necessary to determine quantitatively the amount of HCl present; the value of this determination we have already discussed. The eyelet of the stomach-tube must be invariably examined immediately after withdrawal, for sometimes a little blood, or even a small fragment of growth, may be found lodged in it.

Cancerous patients very soon begin to lose strength and complain of weakness. The ordinary chronic dyspeptic complains a great deal about many things, but he manages to do about as much work, and to get about generally, quite as well as ordinary people; the cancerous patient soon gets unfit for any exertion.

Much was hoped for from examination of the blood, but our hopes have not been realised. Usually, nothing more is observed than is seen in any secondary anæmia, such as a fall in the number of reds and in the amount of hæmoglobin; sometimes there is a slight increase in the polymorphonuclear cells. The pallor may be of that sallow variety which suggests cancer, and then it is of importance, especially if combined with slight wasting.

The presence of tumour is a late sign, but when, on palpation of the abdomen, the right rectus is found constantly rigid while the left is more or less relaxed, this is an almost certain indication of deeper mischief. The growth is usually fixed, but is sometimes found to possess considerable freedom

of movement. Nausea, vomiting, and hæmatemesis are also late symptoms, and so is dilatation of the stomach, and I need hardly add that, by the time one can feel a secondarily enlarged gland above the left clavicle, it shows that the secondary deposits forbid extirpation of the growth.

The pylorus is the usual seat of the disease, but other parts of the stomach may be affected, as Dr. Habershon's figures show, for he found that among 79 cases taken from this hospital the distribution was as follows :—Pylorus, 41 ; lesser curvature, 11 ; cardia, 10 ; anterior wall, 5 ; general, 5 ; centre, 4 ; multiple, 1 ; greater curvature, 1 ; cardia and pylorus, 1 ; not stated, 1.

THE DISTRIBUTION AND TREATMENT OF CANCER AT THE ANGLE OF THE MOUTH.

By G. LENTHAL CHEATLE, C.B., F.R.C.S.,
Surgeon to King's College Hospital.

[With Plates XVI.—XVII.]

In The Practitioner of July 1906, I described the distribution of cancer of the lower lip and its treatment. On reference to that article, it will be seen that when cancer of the lower lip is allowed to follow its natural course of extension, it eventually occupies the circumference of the mouth, encroaching on the chin, cheeks, and nasal region at its periphery. In this article, I point out that cancer, when it begins at the angle of the mouth, behaves in practically the same way by spreading along the upper and lower lips, and into the cheek. *See* Figs. 1, 2, 3, and 4, on Plates XVI. and XVII. overleaf.

The distribution of the cancer, represented in the diagram

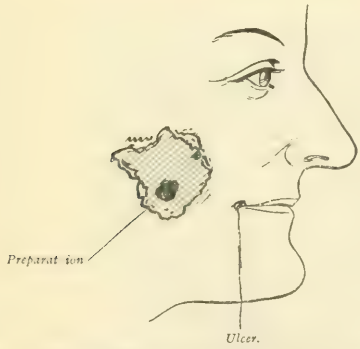

Fig. 5. *Cancer of the cheek and lips. (Dr. Sequeira's case.)*

Fig. 5, which was kindly drawn and sent to me by Dr. Sequeira, is interesting, because the disease began in the cheek, at the point where Dr. Sequeira has drawn the darkest shading, and

from this it spread to the angle of the mouth and along the upper and lower lips, showing that the skin at the darkest spot of the diagram belongs to the mouth and lip area.

I may here state that in the *British Medical Journal*, April 18, and December 12, 1903, and April 20, 1904, I pointed out that the skin of this region belongs to the herpetic region and Dr. H. Head's naso-labial region. It is a point upon which I do not intend to enlarge in this article, for, in cancer of this region, there is more than skin involved, and I will regard the musculature as the better guide to the position of incisions in planning the operation. In doing so, I need not again describe the close anatomical relations which exist between the skin and its cutaneous muscles, but I will refer the reader to the articles in the *British Medical Journal*, December 12, 1905, and THE PRACTITIONER, July 1906. The muscles, which enter into this intimate relationship, and which must, because of it, soon become implicated by the disease when cancer begins in this region are: the orbicularis oris, risorius, buccinator, zygomatici, depressor anguli oris and the platysma. The positions of these muscles form accurate guides as to the pathways of spread of cancer.

I intend to describe the treatment of small cancers at the angle of the mouth. It is difficult to define what a small cancer is, but it will help, if I say that I regard the cases in Figs. 1 and 2 as the limit of small cases, and hence I allude more particularly to cancers of smaller dimensions than those represented in the two figures. In operating on Figs. 1 and 2, I would increase the amount of cheek and upper lip to be removed in Fig. 1, and increase the amount of upper lip to be removed in Fig. 2, but the main lines of the operation in these two cases would be as I describe in the following operation.

Before proceeding with the description of the actual operation, it is necessary to state the following precautions:—

It is important to cleanse the mouth and teeth, and remove all decaying stumps in order to diminish the degree of inevitable infection. It is important to cauterise the surface of the malignant ulcer, till all bleeding has ceased, and the surface has become of a leathery consistence, and, during the removal of the tumour, it must not be squeezed, nor its surface allowed to touch the parts from which it is being removed. This advice

Fig. 1. *Cancer at the angle of the mouth.* (*Royal College of Surgeons' Museum.*)

Fig. 2. *Cancer at the angle of the mouth: a case under the care of Mr. Malcolm Morris.*

Fig. 3. *Cancer of the mouth and cheek.* (*From Guy's Hospital Museum.*)

Fig. 4. *Cancer of the mouth and cheek.* (*From Mr. Hutchinson's collection at the Medical Postgraduates' College.*)

is given in order to lessen the likelihood of transplanting the disease upon the healthy parts.

The operation itself can be divided into three stages :— (1) the removal of the growth ; (2) the removal of the lymphatic glands ; and (3) the plastic stage.

(1) To remove the growth when the cancer at the angle of the mouth is small, the incision in the lower lip begins midway between the growth and the centre of the lip, it is carried downwards through all the structures down to bone, and ends on a level with the lower margin of the inferior maxilla, along which it is further carried through all the soft parts, until it nearly reaches the anterior edge of the masseter muscle. It is not important to avoid cutting the facial vein and artery which may here happen.

The incision in the upper lip begins midway between the growth and the centre of the lip, and is carried upwards through all structures as far as the ala of the nose, around the base of which it curves.

(I will show in a later article that the alæ nasi are attacked quite late in the cancer of the labial region.)

It is then carried in a semi-circle, the convexity of which is upwards, through all the structures of the cheek down to bone, until it nearly reaches the anterior border of the masseter muscle.

The terminations of these two incisions are then joined by a curved incision, the convexity of which is directed backwards. The attachments of the parts enclosed within these incisions are then divided, and the area removed. I fully realise the importance of removing the growth and the lymphatic glands, which drain its area of occupation, in one block. But it is here a question whether it is not running a less risk of infection and transplantation by removing the growth-bearing area separately.

(2) I then, therefore, proceed to the next step of removing the lymphatic glands *en bloc*, the submental, submaxillary, and anterior triangle lymphatic glands are easily exposed as follows :—Continue the vertical incision in the lower lip downwards to the level of the hyoid bone, and carry it back to the anterior border of the sterno-mastoid. Turn back the

flap thus marked out. The region, which contains the submaxillary and anterior triangle lymphatic glands, is thus exposed, but to expose the submental glands, the skin of the chin and beneath it must be undercut, and pulled to the middle line by a retractor.

(3) The final stage is to cover the gap left by the removal of so much tissue of the cheek.

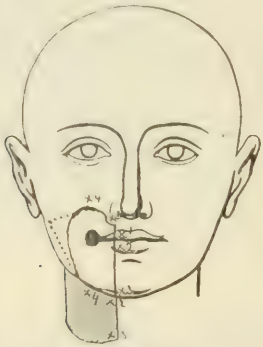

Fig. 6. *Diagram.*

This is easily performed by sewing the flap (marked by the shaded area in Fig. 6), so that x 2 of the flap is joined to x 2 of the lower lip, and x 3 of the flap is joined to x 3 of the chin, and x 4 of the flap to x 4 of the cheek. It will be seen that x 1 of the upper lip makes a better result, if it is sewn to x 1 of the cheek on one side of the ala of the nose. In order to prevent puckering, and to make the flap lie nicely in its new position, it will be necessary to excise a V-shaped piece of skin from the cheek covering the masseter muscle, as marked by dots in Fig. 6. The flap must be well supported in its new position by many closely-placed and interrupted stitches to support its weight. Two tubes should be inserted, one at the lowest part of the wound in the middle line, and one at the posterior and inferior angle of the wound.

To the reader of this description, the operation may appear too radical for a small cancer, and the part that may

appear to him unnecessarily severe is the removal of so much of the lower lip and its neighbouring cheek. But in Fig. 2 he can see that so great a removal will be essential.

A month after the operation, the operator will be agreeably surprised at the appearance of his patient. Even were the state of things otherwise, and the patient were more deformed by this operation than really is the case, the surgeon and the patient should realise that they have been dealing with a terrible disease, and that both can consider themselves most fortunate if their efforts are blessed with the success of its total removal.

THE TREATMENT OF BRONCHIECTASIS.

By ARNOLD CHAPLIN, M.D., F.R.C.P.,
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THE successful treatment of this disease and its complications is of great importance, for, although the affection is extremely chronic, yet, if some of its complications are not warded off by efficient treatment, the patient runs a great risk of a comparatively speedy fatal termination.

Too often, the treatment resolves itself into allaying symptoms as they arise, instead of adopting from the first therapeutic measures calculated to prevent the onset of dangerous complications. In the earlier stages of the complaint, beyond the chronic bronchial catarrh, and the profuse expectoration, there is little to engage the attention of either the physician or the patient. It is hardly recognised that the condition, if allowed to go unchecked, will land the sufferer at a point where his life will be in danger. Since, however, the treatment of bronchiectasis, if energetically carried out, is attended with a considerable measure of success, it is proposed to discuss the various methods, and to indicate those that are likely to be of value.

In order to understand fully the treatment of this disease, the main clinical features may be briefly described. Clinically, two types may be distinguished:—

The chronic type and *the more acute type:* the former being infinitely more common than the latter.

The chronic type has its origin in chronic inflammations of the bronchi, the pleura, or the lungs, which, having failed to resolve, become fibrotic. It is, therefore, never a primary disease. The bronchial dilatations in this type are always multiple, and the process involves all the bronchi in the part of the lung affected. It is also a progressive type, for, as the fibrosis steadily invades the lung parenchyma, so also the bronchial tubes become dilated, until at length the whole of one lung consists of dilated tubes and fibroid tissue, in other words, Corrigan's cirrhosis.

Of the primary conditions which give rise to this condition by far the most common is broncho-pneumonia following measles, whooping-cough, or some other acute illness occurring in childhood. Out of some 200 cases coming under the writer's notice, 60 per cent. dated the onset of the disease from some acute lung attack in childhood. The common history obtained was "congestion of the lungs" following measles, or whooping-cough, or some other acute affection, and a persistent cough with expectoration ever since. Much more rarely, chronic bronchitis and pleurisy were assigned as the starting point of the affection.

The origin of the chronic type of bronchiectasis being as given above, it will be readily understood that it is most frequently met with in early life. Of the series of cases quoted already, very few came under notice above the age of 25, the vast majority, when seen, were under that age. Of the few which presented the disease in the fourth decade of life, the majority were advanced cases with the complications which belong to the terminal stages of the disease.

The duration of the chronic type is considerable, in the series of cases, 22 only are known actually to have died. Many have been lost sight of, it is true, but of these a fair proportion must be undoubtedly dead, since when observed the disease was very advanced. But when the duration of those cases which have died, and those which were in such a condition of advanced disease as to warrant the supposition of early death, is taken into account, no great error will be committed, if the duration of the chronic type be placed between 10 and 20 years. The signs and symptoms of the chronic type need no particular description, for they are well known. It may be observed, however, that the physical signs are mainly those of retracted lung, with compensatory emphysema of the other side, and displacement of the heart to the affected side. Among the symptoms may be enumerated, a turgid muddy complexion, a quiet full pulse, dyspnœa on exertion, cough coming on in paroxysms, especially in the morning, and attended with gushes of profuse expectoration, no rise in temperature, and clubbing of the fingers and toes.

The more Acute Type.—In this type the acuteness is relative only, for even here the disease runs a protracted course, but

does not last nearly so long as the chronic affection. In its mode of onset, and also in its pathological characters, it differs from the chronic form. The main points of distinction may be thus summarised:—1. It is not commonly met with in the earlier periods of life, but is more often observed in the third and fourth decades. 2. It has its origin frequently in an acute inflammation of the pleura, or the lung. 3. There is no long period between the attack from which it starts, and the establishment of the bronchiectasis. 4. From the first the symptoms and constitutional effects are pronounced and grave. 5. Contraction of the side of the chest in which the disease is situated, is not pronounced. 6. It shows but little tendency to invade the whole of the lung. 7. The dilatations are not numerous, often single, or at most two or three. 8. Post-mortem, ulcerative changes are found in the walls of the dilatations. 9. Metastatic phenomena, such as abscess of the brain, are liable to occur.

It will be seen, therefore, that there is a distinction to be drawn between the two forms. The chronic type is a slowly marching affection, which takes years to culminate, the acute form, on the other hand, is attended with grave constitutional symptoms, such as fœtor of the expectoration, hectic temperature, and wasting within a short time of the beginning of the disease, and, if unchecked, will terminate fatally in a few years. The acute type is not nearly so common as the chronic, for in the series of cases already quoted, but eight typical examples have been found. Of course the diagnosis has always to be made between a limited empyema opening into the bronchus, but, as a rule, this is not difficult, the character of the expectoration being the main guide.

Treatment.—To understand the principles of treatment, it will be necessary to state the dangers to which the bronchiectatic patient is exposed. Fowler and Godlee in their treatise have given an admirable picture of the successive stages through which the disease passes. They show how at first the symptoms are trifling and the health fairly well maintained, but that, sooner or later, symptoms of constitutional disturbance make their appearance, such as wasting and hectic temperature. When these take place, they constitute a danger to life.

Now it is exceedingly rare to find profound constitutional symptoms in the chronic type of bronchiectasis, without fœtor of the sputum, and, moreover, it must be conceded that fœtor of the expectoration occurs almost invariably at some time during the course of the disease. It is true that it is generally towards the end of the complaint that it is met with in its gravest form; but, if patients are carefully watched, from time to time the odour may be detected, and at the same time it will be found that the general health is not so good. These transient attacks of fœtid expectoration may pass off and the patient regain his measure of health; or, if the bronchiectasis has lasted many years, the fœtor may be confirmed and never pass away without treatment.

Fœtid expectoration, therefore, should be the one symptom that should be kept constantly in the mind of the physician. Without it, bronchiectasis is a disease which merely limits the patient's capacity for health and enjoyment, but, when present, it may frequently be a sign that his life is in danger. In almost every case in which a fatal termination has been observed, fœtid expectoration has been the starting point of the course downward. The first symptom of bad import, when fœtid expectoration makes its appearance, is loss of appetite. In addition, it will often be noticed that the intervals between the expulsion of phlegm are much longer, but the quantity expelled remains the same, or may be even decreased. The pulse becomes accelerated, the temperature assumes a mildly hectic type, and loss of weight and strength soon follows. The patient then falls into a typhoid condition, and dies of septic absorption, or of some form of pulmonary inflammation. Or, again, death may take place from hæmoptysis, or abscess of the brain. In a few cases, the onset of fœtor has been observed to be followed by an acute inflammation of the joints, simulating the more acute forms of rheumatoid arthritis.

If the foregoing statements are correct, the aim of the physician must be to adopt methods of treatment calculated to ward off the onset of fœtid expectoration. Too often nothing is attempted in this direction until the fœtor has become so pronounced as to render the patient unable to take part in any social intercourse, but if the danger of this symptom

is carried in mind, and its occurrence prevented, the life and comparative ease of the patient will be prolonged.

Without entering into the precise cause of the fœtor, it may be stated as being due to bacterial agency, in which stagnation of the contents of the cavities assists the process. The treatment, therefore, resolves itself into preventing the undue accumulation of sputa in the lifeless and non-resilient tubes, or if that be impossible of accomplishment, into rendering the contents of the bronchi aseptic. To empty the cavities, three methods are usually employed :—1. The method of posture ; 2. The agency of drugs ; 3. The help of surgery.

Posture.—Ewart has laid great stress on this form of treatment, and has formulated in detail the method of carrying it out. There can be no doubt that bronchiectatic patients derive great benefit from it, and in all cases it should be put in practice. The main points in the method may be briefly summarised. The foot of the bed should be raised on blocks six inches high, and not more than one pillow should be allowed. The patient should be encouraged to lean over the side of the bed in the morning, and while in that position make an attempt to expel the contents of the tubes. In children, the plan of lifting them up by the feet, and somewhat roughly percussing the back, is often productive of good results. Respiratory exercises of a forced nature should also be practised.

Drugs.—Emetics have found a place in the attempts to empty the tubes, but it is evident that this method cannot be constantly employed. Stimulating expectorants are generally given, but it must be confessed that they exert but little influence upon the case.

In the past, cases of bronchiectasis frequently came into the hands of the surgeon, but the experience of such operations for opening the cavities, and draining them, has shown conclusively that but little good, and often much harm, has attended the practice. Now that it is generally recognised that, in the majority of cases, the dilatations are multiple, but few operations are performed. The surgeon rarely had difficulty in opening a bronchial dilatation, and draining it, but of what value was that, when, in all probability, many others remained unopened ? In the series of cases quoted, more than one died

as the result of operation performed, when no grave symptoms were pressing.

Surgical operation has little or no effect upon the fœtor, and there are dangers to be encountered during its performance, such as hæmorrhage and septic infection of the pleural cavity, which should give pause before lightly undertaking the project. Indeed, it may be asserted that cases in which the bronchiectases are multiple, *i.e.*, the chronic form, should never be operated on, however bad the condition may be. In the more acute type, the conditions are somewhat different, and so long as the disease, as shown by physical examination, is limited, the operation may be attempted in suitable cases, since here, as a matter of experience, the bronchiectasis is often single, or if double, is at least localised.

Methods of rendering the Contents of the Cavities Aseptic.—To this end drugs have been administered by way of mouth, but with no appreciable result. There is, however, one exception in the treatment of the fœtor by garlic, as advocated by the late Dr. Poore. By this method, the fœtor can be certainly changed, but it is doubtful if the contents of the cavities are rendered aseptic for any length of time. Inhalations of thymol eucalyptus, and other similar essential oils, are also prescribed, but with no lasting benefit.

Intra-tracheal injections advocated by Grainger Stewart have been employed, and with very good results. The only objection to their use is the manual dexterity required in the operation. The fœtor can certainly be removed, but one may reasonably ask if the lowest bronchiectases can be reached by this method, and if the small quantity introduced is sufficient to render aseptic the whole of the bronchial tract.

The Inhalation of Creosote Vapour.—Eleven years ago, the writer advocated the use of the vapour of the common commercial coal-tar creosote in the treatment of bronchiectasis. He was led to try this method on account of its being brought to his notice that a patient in the hospital, suffering from the complaint, had expressed his intention to try to obtain work again at some large creosote works, since he had felt much better when working there some time previously. A visit was paid to the works in question, and some of the creosote obtained. Several patients were placed under the treatment,

and, after the details were worked out, the excellent results from the use of this method were soon manifest. Patients who had been in despair, after trying all manner of remedies, rapidly improved. Since then this treatment has been extensively used by the writer and other physicians, and the result has been to establish it as one which is perfectly safe, and one which offers considerable prospects of success. In using this method, it must be remembered that it is of the utmost importance to carry it out in detail, and to persevere with it until the patient has become accustomed to the somewhat trying conditions. Too often it has been abandoned before it had a fair chance of doing good.

But the fact remains that, in the large majority of cases, in which the creosote inhalations have been fairly tried, benefit has resulted, beyond that accruing from other methods, and frequently lasting good has taken place, and in a few cases permanent cure of the fœtor. In undertaking this treatment, the natural objection of the patient to submit to a method which is irritating must be gradually overcome. Until the patient has had a daily sitting, lasting for from half an hour to one hour, for a week or two, improvement to any extent, must not be expected.

As the success of this method depends so much on the details, the main points will be given. The room should be small, about seven or eight feet square, and it should be made as airtight as possible, so as to prevent the undue escape of the vapour. There should, however, be sufficient ventilation to allow some fresh air to gain access to the room. In the centre of this room, on a raised stand, a fairly deep enamel dish on a tripod should be placed, and under the dish a spirit lamp with a regulating mechanism. Into the dish, about five or six ounces of common commercial coal-tar creosote is poured. The creosote can be obtained from Messrs. Burt, Boulton & Haywood, of 64, Cannon Street, at a price of about sixpence a gallon. Before the patient enters the chamber, the spirit lamp should be lighted, and the creosote vapour driven off, until the room is fairly thick with the fumes. Until the patient is accustomed to the fumes, the room need not be densely filled with the vapour. If the lamp is regulated, there is little fear of the creosote either boiling over or catching fire. The

patient's eyes should be protected with a pair of watch glasses rimmed with a piece of ordinary sticking plaster, and the nostrils should be plugged with pieces of cotton wool. The sitting at first should last about twenty minutes a day, and be gradually increased until an hour is taken, and the room is so dense with fumes that it is difficult to distinguish objects. For those who are nervous, it is a good plan for the attendant to take the first few sittings in the patient's company, or, a pane of glass may be let into the door, so that the patient feels confidence when he sees that the nurse is close at hand, and watching. The sittings should be continued for six weeks or three months, after that a bi-weekly sitting should take place. Such is the method, which at first sight appears to be a drastic and nauseating proceeding, but the writer has never met with a case unable to take the treatment, out of an experience of over a hundred cases treated.

When one remembers the terrible results to the patient, and those in immediate contact with him, from fœtor of the expectoration, any treatment that offers relief must be welcome. The results of the treatment are, generally, a decrease of the symptoms occasioned by the fœtor. Thus, the appetite returns, the wasting stops, and the temperature falls. Often, the expectoration is not altered so far as quantity is concerned, but, in a short time, the odour disappears, and the patient regains his usual health. This treatment cannot, of course, offer a prospect of cure, but it affords the means of checking and removing the most dangerous symptom of the disease, and so long as that can be accomplished, bronchiectasis is merely a condition of disablement. As to the results of the treatment in the writer's hands ; three cases only have failed to be improved, while in the majority very considerable benefit has resulted, the fœtor ceasing in almost every case, and in many, not returning for a long time, and then to be quickly removed by further sittings.

Now, although the main object of the creosote inhalations is to remove the fœtor when present, yet it should also be used to prevent the onset of this symptom. For the last five years, the writer has adopted the plan of submitting all patients to the creosote treatment, whether fœtor was present or not, and the results have been most gratifying. Many of

these patients during that period have shown no tendency to develop fœtor, although the stage of their complaint was such as to lead one to expect the onset of this symptom. It may, therefore, reasonably be supposed that, if the practice of giving the patients periodic sittings in the creosote chamber were systematically carried out, the most dangerous symptom of the complaint might, in great measure, be obviated, and the life of the patient thereby prolonged.

This treatment may be given with perfect propriety in all cases, no untoward results have ever been recorded. In the more acute type, it may also be given, but here the surgeon has an undoubted chance of doing good by operation, on account of the disease being limited and localised. As adjuncts, life in a pure atmosphere, with an equable temperature, should be enjoined, and the usual rules of life, applicable to bronchitics generally, should be followed.

URINARY EXCRETION IN BRIGHT'S DISEASE.

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THE truism that a knowledge of the normal functions of any organ of the body is essential to a clear conception of the modification of those functions brought about by disease is admirably illustrated by the kidney. For many years, the process by which the kidney normally produces urine, has been a matter of controversy ; and so long as it was uncertain whether urine was secreted by the kidney, or was produced by filtration through the glomeruli and absorption by the tubules, the pathology of renal disease inevitably remained imperfect. Evidence, however, has recently been brought forward that the kidney produces urine by a secretory process. It is well known that the kidney of the frog has a double blood-supply ; the renal arteries supply the glomeruli, and, secondarily, the tubules, while the renal portal vein supplies only the tubules. Ligature of the renal arteries abolishes the blood-supply, and *ipso facto*, the functions of the glomeruli, leaving the tubules almost intact. It is obvious, therefore, that if a frog, after ligature of the renal arteries, produces urine, that urine must have been *secreted* by the tubules. When frogs are kept in air, they produce no urine after complete ligature of the renal arteries, and, as shown by Beddard, the epithelium of the tubules rapidly degenerates. Partly on account of this epithelial degeneration, partly because they failed to demonstrate the completeness of their ligatures, the earlier experiments of Nussbaum and of Adami were inconclusive ; the absence of urine might have been due to degeneration of the tubules, and the formation of urine to an incomplete ligature. Beddard and I have recently shown that, when frogs are kept in an atmosphere of pure oxygen, the tubular epithelium remains microscopically normal, and urine is secreted ; the completeness of the ligature of the renal arteries was demonstrated by cutting the kidneys in serial section. The urine, secreted by the tubules of such frogs,

contains urea, chlorides, and phosphates, and is acid in reaction; it corresponds closely in composition with the urine of normal frogs. Since the tubules secrete urine, there is no reason to suppose that urine is formed by glomerular filtration and tubular absorption. In all probability, the glomeruli, as well as the tubules, secrete urine, and both secrete much the same urinary constituents in solution; and, as a rule, the tubules, in virtue of their greater surface area, secrete most of the urine. But when large quantities of water have to be passed out, as during saline diuresis, this is effected chiefly by the glomeruli; for we found that frogs, whose glomeruli had been put out of action, were unable to secrete large quantities of urine. This glomerular diuresis, however, is a true secretion, and, although greatly by increased blood-flow through the kidney, it can take place independently of vascular changes. Similar conclusions as to the secretory functions of the kidney have been reached by Miss Cullis, who perfused dead frogs through the renal arteries, the renal portal vein, or both these sets of vessels. She was able to show that some diureses, such as that due to phloridzin, are the result of activity of the tubules.

Admitting that urine is normally secreted by the kidney, the characters of the urine in Bright's disease may now be considered. In this connection, the term "Bright's disease" is made to include acute nephritis, the chronic forms characterised by a large white or a small white kidney, but excluding the typical red granular kidney. So far as is known, the normal stimulus to renal activity is a chemical one; the kidney is called upon to excrete water, urea, and other substances, and the presence of these substances in excess in the blood excites a flow of urine. The urine may be abnormal, because the kidney fails to respond to the normal chemical stimulus, or because the stimulus is deficient, or because abnormal constituents are excreted from the blood. All these conditions are realised in the various forms of nephritis.

In acute nephritis, the vascular engorgement lessens the blood-flow through the kidneys, and thereby diminishes the chemical stimulus to the renal epithelium; usually, the secreting epithelium is also obviously damaged, partly owing to the deficient supply of oxygen resulting from the vascular con-

gestion. Under these conditions, the secretory power of the kidney is impaired, and the urine is scanty in amount.

In the more chronic forms of Bright's disease, the morbid changes are epithelial rather than vascular, and, in the absence of dropsy, or other complications, the urine is usually excessive in amount. At first sight, it seems surprising that a damaged kidney should yield more urine than a healthy one. Galeotti has shown, however, that the kidney naturally does its work in the easiest fashion, and that it does less work when it secretes a urine of low concentration and osmotic pressure than when the urine is concentrated. He found that, after increasing the osmotic pressure of the blood, the kidney reduced that pressure to the normal more rapidly, and with less expenditure of energy, when the animal (under experiment) was allowed to drink plenty of water, and secreted a *dilute* urine. The normal kidney can adjust itself to varying conditions by secreting, at one time dilute, at another time, concentrated urine, but the diseased kidney has apparently lost this capacity; it can no longer perform the work necessary for the production of a concentrated urine, and the more extensive the disease, the greater is the flow of dilute urine. For this reason, it is not usually possible, in chronic disease, to ascertain the nature of the lesion from the characters of the urine, since the latter may have much the same composition in different forms of Bright's disease.

There is, further, both experimental and clinical evidence to show that the secretory powers of the kidney for solids is defective, and that retention of urea and salts occurs when the ingestion of nitrogenous food, or sodium chloride, is relatively or absolutely excessive. Weber found that dogs, suffering from experimental nephritis, passed an abnormally large quantity of dilute urine; that not all the nitrogen and sodium chloride taken by the mouth was excreted; and that, in the terminal stage of the disease, the secretion of urine became scanty, and the renal cells no longer responded to the stimulus of diuretics. On the clinical side, von Noorden and others have shown that in nephritis, retention of nitrogen occurs, unless the nitrogenous intake is moderate in amount.

In this connection much attention has recently been paid to the excretion of chlorides in renal disease. Widal was the

first to point out that in chronic (parenchymatous) nephritis the urine often contains very little chloride, and that, if more salt was given by the mouth, most of it was retained in the body, and was accompanied by the production or increase of dropsy; on the other hand, a salt-free diet often lessened dropsy. These observations have been confirmed and extended to ascites and to cardiac dropsy. The phenomena were ascribed by Widal to "renal impermeability" to chlorides in nephritis. Other have supposed, however, that the kidneys are not at fault, and that the chlorides are retained, by entering into combination with proteids, or by the tissues, or by water in cases in which dropsy exists. That water does not cause retention of chlorides in nephritis can be shown by increasing the intake of water, while the chloride intake remains constant. Under such conditions the chloride output is increased, although there may be retention of water, as shown by the patient's increase in weight. The converse question, whether retention of chlorides necessarily involves the retention of water, can be answered by measuring the chloride intake and output, and observing whether the patient's weight and dropsy increase proportionately to the amount of chloride retained. In nephritis *with dropsy* an increase in weight is usually due to a retention of water.

It is known that the percentage of chlorides in the blood and lymph is remarkably constant, and is about 0·55 per cent. In order to maintain this constant percentage, the retention of 10 grammes of chloride would involve the concomitant retention of approximately 1,820 cc. of water. Investigations, made at Guy's Hospital, show that a retention of chlorides is accompanied by a retention of water closely corresponding to the theoretical amount, assuming that in disease the blood and dropsical fluids contain their normal percentage of chlorides. In one case of ascites the percentage of chloride in the ascitic fluid (on tapping) was 0·58 per cent. On a salt-free diet, which really implies an intake of about 1 gramme of salt in 24 hours, the patient's weight remained constant. A known quantity of salt was then added daily to this diet. In nine days the patient took 43½ gr. salt, and excreted in the urine and fæces 18½ gr. Thus 25 gr. were retained, which corresponded to a theoretical retention of 4·5 kilos. of water. The

actual increase in weight was 4·7 kilos., and, as the patient's girth measurements showed, most of it must have been due to retention of fluid. It is obvious that the observations cannot possibly be of a very accurate nature, and, in other cases, the correspondence between the increase of weight and the amount of salt retained was less exact. But it appears that the retention of chlorides is primary, and that of water is secondary to it, and that a definite relation exists between the amount of salt retained and the increase of dropsy in some cases.

It is, however, still possible that a retention of chlorides occurs quite independently of the kidney. Chlorosis appears to be a case in point; in this disease, a retention of chlorides has been observed, although there was no evidence of renal disease. But the cause of the retention in chlorosis is possibly peculiar to that disease, and is not understood. In pneumonia, and in other febrile diseases, there is retention of chlorides, and Hutchison has found that the tissues of such patients contain chlorides in excess, but the presence of chlorides in excess in the tissues does not prove that they primarily determine the retention of salt. There are some facts, indeed, which point to a selective secretory power on the part of the kidneys. Brodie and others have shown that, during a sodium sulphate diuresis in normal dogs, the output of sodium chloride becomes extremely small.

In nephritis, too, the daily output of chlorides may be reduced to nil, while the total nitrogen in the urine is still 9 or 10 grammes.

Moreover, a case, published by Bryant, indicates that there is a limit to the secretory capacities of the normal kidney. A healthy man, who was in the habit of eating enormous quantities of salt became dropsical; the dropsy disappeared, as soon as the intake of salt was reduced to a normal amount.

These facts suggest that a retention of chlorides occurs, either when the intake is excessive, or when the secretory capacity of the kidneys is impaired; the latter condition exists in renal disease and probably in cardiac disease, and also in febrile diseases. It appears, also, that a selective action on the part of the kidneys is concerned in the retention of salt, although the explanation of the process is not obvious. The

retention of salt, however, is determined by the kidneys rather than by the tissues in general.

Metabolism in Bright's Disease.—Many observations point to the existence of abnormal metabolic processes in cases of Bright's disease. In the first place, amido-acids have been found in the urine in considerable amount, whereas they are present only in traces in normal urine; these amido-acids are intermediate products of proteid metabolism, and their appearance in the urine indicates that metabolism is being imperfectly carried out. Secondly, the estimation, by modern methods, of the percentage of urea, ammonia, kreatinin, and other urinary constituents in relation to the total output of nitrogen, often shows an increase of ammonia and a decrease of urea. And Ascoli has found, in acute Bright's disease, an increase, and in chronic Bright's disease, a decrease in the output of kreatinin, as compared with that of normal individuals on a similar (kreatin-free) diet. An excess of nitrogenous extractives has also been found in the blood and tissues of patients suffering from nephritis, particularly in cases of uræmia; and the alkalinity of the blood is often lessened in uræmia.

The influence of the kidneys on proteid metabolism was pointed out by Rose Bradford, who found that removal of three-quarters or more of the total kidney weight (in animals) was followed by an increased excretion of nitrogen and great muscular wasting. His observations have given rise to the idea that the kidneys have an internal secretion, which normally controls nitrogenous metabolism, especially in the muscles, and that, in the absence of such secretion, there occurs an excessive breakdown of proteid. And it is often supposed that the absence or deficiency of the internal secretion of the kidneys accounts for the metabolic disorders of many cases of renal disease. Butler and French, however, examined the nitrogenous metabolism in a case of severe nephritis complicated by uræmia, and found no evidence of excessive nitrogenous breakdown.

In Bradford's experiments, moreover, although the nitrogenous output was excessive, there was no evidence that the percentage of the various urinary constituents in relation to the total nitrogen was abnormal; on the other hand, there is evidence that, in Bright's disease, the nitrogenous

metabolism is abnormal in character rather than excessive in amount. These alterations in nitrogenous metabolism are susceptible of another explanation ; they may possibly be the result of deficient secretory power on the part of the kidneys, whereby urea and other nitrogenous bodies accumulate in the tissues. The formation of urea is merely the last of a series of changes which proteid undergoes in the body. Many of these are known to be effected by enzymes, and Beddard has pointed out that interference with the normal course of a single stage of proteid metabolism tends to throw out of gear proteid metabolism as a whole. The accumulation of urea in the body, for instance, may by a mass action inhibit or reverse the normal conversion, by the liver and other tissues, of intermediate metabolic products into urea ; as a result, ammonia and even amido-acids would be present in excess in the tissues and urine. On this view the fundamental fact in Bright's disease is a more or less extensive impairment of the secretory activity of the kidneys. It may be doubted, however, whether in Bright's disease the retention of urea is sufficient seriously to affect the conversion of intermediate metabolic bodies into urea. The investigation of the total intake and output of nitrogen, in a number of cases of Bright's disease, would be of great value in deciding whether the abnormal metabolism often observed results from an excessive proteid breakdown, or from the retention of urea and other urinary constituents.

SERUM-THERAPY.

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(*Concluded.*)

We have now to consider the reason why these antibacterial, or bacteriolytic, sera have proved so disappointing in practice. Their mode of action is well known. Two substances are necessary: first, a stable substance, the amboceptor, or immune body, and, second, an unstable substance, present in normal blood, the alexin or complement. The former substance is the antibody, analogous to antitoxin, and is present in large amount in the serum of animals which have been immunised by means of injections of the bacterium in question. As an example of the quantity which may be produced in this way, Shiga's antidysenteric serum may be quoted. It was found that ·0001 c.c. of this serum, when activated by a suitable amount (·3 c.c.) of fresh serum, would completely destroy all the dysentery bacilli in 1 c.c. of culture. This indicates an extremely high grade of potency, and it is fair to assume that, if we could get a similar action in the human body, a very few drops of serum would be sufficient to cure the most severe case of dysentery.

It is generally believed that the action of antibacterial serum commences by the union of the amboceptor with the bacterium, a union which does not, to a perceptible extent, alter the latter in vitality, or in pathogenic action, and that this is followed by a union of the complement in suitable amount with the combined amboceptor. As a result of this a sort of ferment action takes place, and the bacterium is destroyed. Now the antibacterial sera, as placed on the market, are devoid of complement, which is an unstable substance, and which disappears in a few days at the ordinary temperature, and is, moreover, very susceptible to the addition of minute amounts of the preservatives used.

When such a serum is injected into a patient, it probably unites with the bacteria, just as it does *in vitro*, and the

preliminary stage of bacteriolysis is effected. For the further stage the presence of a proper amount of a suitable complement is necessary, and it is here that the first source of failure occurs. The commercial sera are made from the lower animal, as a rule from the horse, ass, or goat, and are readily activated by complements from these animals, but not necessarily by those of human serum. Thus, according to Ehrlich,[21] the reason for the failure of antityphoid and anticholera sera, both of which can be obtained in a state of great potency, in the treatment of human disease is the fact that they are not activated by human complements. He made two suggestions to obviate this difficulty. On the one hand, mixed sera from several animals might be used, in the hope of finding one suitable for activation with human serum ; on the other, the serum might be prepared from the higher apes, since sera are usually activated by complements from closely allied species. I am not aware that either of these suggestions has been put into practice, and other considerations would not suggest that they afford much hope of success.

In some cases this unsuitability of the complements cannot be the explanation of the failure. Thus Shiga's serum is readily activated by human complement, which was found to be as suitable as that of the horse. Now although there is reason to think that this serum has been of some value in the treatment of dysentery, it is quite certain that its efficiency is less than the test-tube experiments would suggest. We must look further for the explanation.

In a few cases it may happen that although the human complement is suitable in nature, it is deficient in amount,—and it has, in fact, been shown to decrease in certain diseases. Thus there is reason to believe that complement is derived, partially at least, from the leucocytes, and that one of the means adopted by nature to combat an infection is to increase the leucocytes and thereby the complement. In a severe infection, as is well known, this increase in the leucocytes may fail, and the prognosis is then unusually bad. Attempts have been made to increase the number of the leucocytes, and thus indirectly the amount of the complement, though without much therapeutic success. It should be pointed out, however, that, in all probability, the ordinary

medical measures adapted to "supporting the patients' strength" act indirectly on the infection by increasing the output of complement.

Another and much more important and serious cause of failure comes about by means of the phenomenon described by Neisser and Wechsburg, and known as the "deviation of the complements." When a certain amount of bacterial complement is mixed with a certain amount of culture, and varying amounts of antibacterial serum are added, it is found that a certain dose of the latter will bring about complete destruction of the bacteria, but that larger or smaller doses have less effect, or none. Thus, Shiga showed that, when 1 c.c. of dysentery culture is mixed with ·3 c.c. of human serum, the addition of ·0001 c.c. of his antidysentery serum would lead to the destruction of all the bacilli, but that ·0003 had no effect, and ·00003 very little. We need not discuss the theoretical explanation of this phenomenon, but it is important to remember that the dose of antibacterial serum must be most nicely adapted to the amount of complement available. The same thing occurs *in vivo*, for Löffler and Abel showed that when guinea-pigs were injected with a definite amount of culture of *B. coli* only those recovered which received between ·02 and ·25 c.c. of immune serum, larger or smaller amounts being useless.

Now in disease of natural occurrence it is highly probable that this deviation of the complements does not occur. Take, for example, the process of recovery from typhoid fever. At first there is little amboceptor for the typhoid bacillus in the blood, and the amount that is present quickly unites with the invading bacilli, so that it may disappear entirely from the serum. Soon, however, the tissues which are acted on by the bacilli begin to form the specific antibody,—*i.e.*, amboceptor—in increasing amounts; but this does not at first accumulate in the blood, since it has an affinity for, and combines with, the typhoid bacilli in the tissues. There is now a race for the mastery. At first the bacilli proliferate with a speed out of proportion to the output of amboceptor, and the disease progresses to its height. The production of large amounts of antibody does not take place for some time, but when it does it occurs rapidly and (in cases that recover)

gradually outstrips the bacteria, and at a certain time the amount present will be proportionate to the bacteria and to the complement, just as in the test-tube experiments alluded to above. The bacilli which are exposed to this action will then be destroyed, and the process of recovery commences. At a later date than this the amount of amboceptor may increase, and the conditions for the deviation of the complements will be present, but before this the critical point must be reached, and the bacteria destroyed. I throw it out as a suggestion, however, that this excess of the complement may determine a relapse, reinfection taking place by means of bacteria which have been shielded from the bacteriolytic action which determined the cure of the primary attack, *e.g.*, those present in the bile.

Now in a case in which this gradual increase of the amboceptor is taking place, the addition of large amounts of foreign amboceptor may lead to an excess of this substance relatively to the complement, and thus the deviation of the complements may be brought about. Thus the use of a large dose of potent serum may be not only useless but actually injurious, leading to an interference with the normal curative processes, and in no way helping them. The conditions may be reproduced exactly *in vitro*. A serum which is weak in bacteriolytic power may be rendered absolutely inert by the addition of large quantities of a powerful immune serum.[25] We may, therefore, feel fairly certain that the use of indiscriminate large doses of a serum which acts solely as a bacteriolytic agent is useless, and not devoid of danger; of course there may be other actions (antitoxic, stimulant to phagocytosis, etc.), which either partially or completely counteract this danger.

Again, an attempt has been made to supply the deficiency in complement by using freshly prepared immune serum, or by complementing it by the addition of fresh serum from some suitable animal. These processes seem to be useless in practice, the reason given being that alien complements do not circulate in the blood, but unite with the tissues and so become inert.

There are several other reasons which militate against the successful use of purely antibacterial sera, such as those acting on the bacteria of cholera and typhoid fever; thus

the organisms may be, and, in the case of cholera, almost certainly are, situated in regions where they are shielded from the action of the serum. Whether these difficulties may be overcome in the future is very doubtful, but at present the outlook does not seem promising, and no real advance in the application of these sera to therapeutic uses has yet been made.

The hopes for the future lie in the successful prosecution of two lines of research, the production of powerful opsonic sera and of anti-endotoxins.

With regard to opsonic sera, there is now a large amount of information at our disposal. We know, for instance, that the presence of opsonins is necessary for phagocytosis, that the degree of immunity to a given infection is in some measure dependent on the amount of these substances in the blood, and that the latter can be raised by means of suitable methods of vaccination to an abnormally high level. The degree to which this can be done varies in the case of different micro-organisms. Thus in the case of tubercle and staphylococci it is rare that we are able to raise the index to more than twice the normal figure; the highest figure which I have seen in the case of tubercle is 2·3. In other infections higher figures may be obtained. Thus in a pneumococcal infection, I have succeeded in raising the index to 3·5, and Dr. J. C. Briscoe informs me that he has seen one of 9 in the case of a patient convalescent from pneumonia.

It is now generally known that the height of the opsonic index is not proportionate to the amount of opsonin present in the serum: a doubling of the opsonic index means that the quantity of opsonin present has been increased in a far greater ratio, possibly five or six times. This being the case it follows that an index of 9 indicates a very great excess of opsonin over the normal figure, how great it is impossible to say; but it is probably so large that, if 10 or 20 c.c. of such serum were injected into the blood-stream of a man, it would bring about a perceptible increase in his opsonic index. In this connection we must remember that the opsonic index after the crisis in pneumonia is not necessarily raised much above normal.[26]

I believe that it would be quite possible to produce sera which would produce a sufficient rise in the opsonic index when injected in reasonable amounts. The method would

appear to be specially worthy of trial in pneumococcic infections and in plague, for in each of these the presence of bactericidal substances in the blood is doubtful, whilst that of opsonins is now well established, and all indications seem to point to the fact that immunity to, and recovery from, the diseases they cause is due almost entirely to phagocytosis.

The difference between a specially-prepared opsonic serum and the sera used at the present time would be two-fold. In the first place, the treatment of the animals from which the serum is to be prepared is at present quite haphazard: the animals are injected with increasing doses, as much as they will stand, and the injections are repeated as soon as the obvious symptoms have disappeared. This, however, is not the way to procure a serum rich in opsonins, for which the dose must not be too large and must be nicely graduated by means of repeated determinations of the opsonic index. Further, the animal must be bled only when the examination of the blood shows the greatest amount of opsonin obtainable. In the serum at present sold it is almost as likely that the amount is below normal as that it is raised.

In the second place, such sera must be used fresh. Most of the English researches, now so numerous, agree that opsonins are very labile substances, which disappear in a few days at the room-temperature, and are readily destroyed by heat: a few German observations (Neufeld and Rimpau), it is true, would appear to show that there may be other substances having the same action, but greater powers of resistance. Much more cogent evidence is necessary before this view is held, since all pathologists who have worked with the very accurate technique introduced by Wright, and, as yet, almost unknown on the Continent, are fully aware of the evanescent nature of these substances.

These facts may have some bearing on the divergent results, which have been reported from the use of these sera, notably the anti-pneumococcic. Thus numerous Italian observers have claimed excellent results from Pane's serum, whilst Römer's has been found very beneficial in Germany, whereas comparatively few successful cases of the use of either have been reported from England. It is not necessary to cast the slightest doubt on the *bona-fides* of these observations, when we consider that the medical men using the sera near the laboratory where it is

prepared would be more likely to get it fresh, and that the time spent on a journey from Italy to England would be sufficient to cause a very decided fall in its opsonic value.

The other direction in which promising work is being carried out, is in the direction of the formation of an anti-endotoxin. The toxins of the pathogenic bacteria, other than those of tetanus and diphtheria, and two or three others of less importance, are entirely unknown, and the most careful researches, on very varied lines, have failed to show any method by which they can be produced *in vitro*. There is every reason to believe that they exist, and that the symptoms of the diseases in question are due to them, and there is a high probability that, if they could be procured, the production of an antitoxin would be possible. They appear, however, to be locked up in the body of the bacteria, and only to be set free when this undergoes solution in the body: at least emulsions of these bacteria which have undergone autolysis, or which are dissolved by other methods, are either devoid of true toxin or contain it in very small amount. Nor is an antiendotoxin necessarily formed by the injection of the dead bacilli without preparation, for this leads to the formation of bactericidal substance (amboceptor), which, as we have already seen, has no antitoxic action; as an example of which we may quote the observation of Pfeiffer, that an animal which has received a large dose of dead cholera bacilli and also some immune serum may die, whereas one that has received the dead bacteria alone may recover.

The new development consists in an attempt at the preparation of a true endotoxin, by freezing the bacilli at the temperature of liquid air, grinding them into an impalpable powder, and centrifugalising the fluid obtained on thawing, until all solid particles are removed. This process has been carried out by A. MacFadyen [27] and his collaborators in the case of many bacteria, and the results are of great interest and full of hope in regard to their clinical applications. The solution obtained is sterile, and it appears to contain a true toxin, although not in very large amount as compared with the quantity obtainable from diphtheria or tetanus bacilli. Thus, in the case of the typhoid bacillus, the lethal dose for rabbits was ·1 c.c.—·05 c.c. This amount caused acute diarrhœa and collapse, and often death within two hours. In two cases,

·05 c.c. was fatal to a goat. The important feature of these experiments was that they led to the production of a potent antiendotoxin. This was prepared from the goat, and was so powerful that $\frac{1}{50}$ c.c. would neutralise 30 lethal doses of the toxin, normal goat-serum being devoid of any appreciable power in this respect. The published results deal with the bacilli of typhoid, cholera, and dysentery, but are capable of much wider application.

The "Serum Disease."—The fact that rashes and other phenomena may follow injections of serum of whatever description became apparent soon after the introduction of diphtheria antitoxin, and had indeed been observed as early as 1874 by Dallera. This affection has recently attracted much attention, having been studied with great care from a clinical standpoint by von Pirquet[28] and Schick, whilst its pathology has been investigated by Hamburger, Moro, and others. Advances have also been made in its preventive treatment.

It is usually preceded by an incubation period of 8 to 12 days, but when a patient has received a large dose of serum, and then, after an interval of 3 to 8 weeks, a second dose, not necessarily large, it may come on immediately, or after an interval of a few days. The most constant symptom is *fever*, usually of the remittent type. The *rash* varies greatly in type, and is most usually urticarial, and, in this case, may be confined to the region of the injection, or may be generalised. The rash may also take on any of the types included under the head of erythema multiforme, being scarlatiniform, morbilliform, erythematous, etc. According to von Pirquet and Schick the morbilliform rash accompanies high fever, the scarlatiniform moderate fever, and urticarial rashes arise when the temperature is not greatly raised. They probably all represent different grades of the same affection, and are all accompanied by severe itching.

The lymph-glands, corresponding to the region injected, are frequently enlarged. This enlargement comes on before the other signs develop, and their return to normal is the first indication of recovery. Pains in the joints are often present; the metacarpo-phalangeal joints are most frequently affected, then the wrist and knee. Slight general œdema is also common, and slight albuminuria occurs in a few cases.

The leucocyte count is slightly raised during the incubation period, and falls suddenly when the symptoms occur. The fall is due mainly to a diminution in the polynuclears.

The severity of the disease is, as a general rule, proportionate to the amount of serum injected, an additional reason for the use of antitoxin of high potency. Apart from this, nothing is known as to the pathogenesis of the disease, though some horses may have unusually active serum, and some persons have thought that the addition of antiseptics tends to increase the incidence of the affection.

The pathology of the disease has not yet been made clear. Hamburger and Moro[29] suggested that the symptoms might be due to the formation of precipitins, and that these might give rise to precipitates in the smaller vessels, especially in the skin, by combining with some of the original serum still present, or introduced subsequently. Thus it is now well known that the serum of a patient who has been treated with diphtheria antitoxin of equine origin will often precipitate horse-serum if examined a week or so after injection, and it is suggested that this takes place *in vivo*, and that the resulting precipitate interferes mechanically with the circulation.

Hamburger and Moro have now abandoned this theory, since other authorities appear to have shown that this precipitation does not occur in the living body. Further, the disease may develop when no precipitins occur, at least when none can be *demonstrated* in the blood, or may be absent when large amounts of precipitin occur. Thus Widal and Rostane[30] have shown that a powerful anti-human serum may be injected intravascularly in man without necessarily producing the serum disease. Marfan, however, still thinks that the theory need not be abandoned, and there is much to be said in favour of his suggestion that there may be substances of which nothing is known which prevent the precipitation in some cases. The observations of Rovere,[31] Marfan, and Le Play[32] certainly appear to show some degree of correlation between the appearance of precipitins in the blood and the development of symptoms.

A decided advance in the preventive treatment of the serum disease has been made in the introduction of calcium chloride by Netter.[33] It was administered in doses of one gram at the time of each injection and for two days subsequently. Among

114 cases treated in this way he had 11 mild cases of serum disease, whereas, in a control series of the same number, it developed 20 times. These results are readily credible, in view of the well-known fact, first shown by Wright, that many cases of urticaria are accompanied by a deficient power of coagulation in the blood, and a diminished calcium-content, and are curable by a calcium chloride or lactate. Why the injection of serum should cause such alterations in the blood, and what is the reason for the delay in the appearance of the symptoms, are not so clear; possibly the formation of the precipitin, or of the precipitates they cause, may remove some of the calcium from the blood. If this is the case we might get the development of the serum disease in a few patients only, *i.e.*, in those with a deficient calcium-content at first.

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INTUSSUSCEPTION IN INFANTS.[1]

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The interest in acute intussusception, or invagination, lies in the fact that, while it is the commonest form of acute intestinal obstruction in infants, it is comparatively rare in later childhood and adolescence, and in adult life it is exceedingly uncommon. The importance of the affection is evidenced by the knowledge that prompt diagnosis and treatment usually lead to a successful issue, whereas delay of even a few hours may mean that the invaginated bowel becomes irreducible, and a fatal issue certain.

The disease usually occurs in healthy strong fat babies, under one year, of whom a large majority have been entirely breast-fed, and in whom there is only exceptionally any evidence of improper feeding, gastro-enteritis, or wasting, which are stated by some authors to be the predisposing causes of the condition—an opinion which many recent observations conclusively prove to be incorrect.

I can suggest very little as to causation, for any explanation, which can satisfy searching scrutiny, must conclusively show why it is so common in babies and yet rare in adults. The above postulate at once suggests some anatomical condition which is present in infancy, but which gradually disappears towards adolescence, and when, in conjunction with this, we remember that the ileo-cæcal region is the commonest situation of intussusception, and that here the small bowel, with a long freely movable mesentery, is giving place to a more fixed large intestine with wider lumen, we have an anatomical fact which may be one factor in the production of an intussusception. Further, I have often thought that the relatively greater freedom of the ileum and cæcum in infants, and even of the lower part of the ascending colon, where the embryonic mesentery is often incompletely transformed into

[1] Read before the Beckenham Medical Society.

the adult or normal condition, may help to explain the age incidence of this disease.

For the fact that it is about twice as common in male as in female children I can offer no explanation.

These remarks are founded on operations on nineteen infants with acute intussusceptions under one year, and I have purposely excluded all my cases in older children or adults and also those suffering from chronic intussusceptions. In considering their symptoms, I would lay stress on the sudden onset of abdominal pain, evidenced in a previously healthy baby, by screaming, refusal of food, and drawing up of the legs; vomiting may take place once, but its repetition, until the late stages of obstruction are reached, is, in my experience, exceptional. When obstruction is complete, vomiting recurs, and has all the characters of other forms of acute intestinal obstruction, then also constipation is complete. Blood may be passed in the initial paroxysm, but it is more common for from five to ten hours to elapse before the typical blood and slime are passed, and, during this time, one or more normal motions may be evacuated, or the bowels may be somewhat relaxed. None of my cases showed diarrhœa before operation, and in fact the time interval, before blood is passed, is just what would be expected, for the bleeding can only indicate exudation from an engorged mucosa, a condition which does not immediately follow upon the onset of symptoms. Fortunately for the patients, the above symptoms are usually alarming enough to necessitate examination by a medical man, when an abdominal tumour is sought for.

After a few hours of intussusception, the aspect of the baby is characteristically "abdominal"; the ringed sunken eyes and the greyness round the mouth forcibly demonstrating that the child is ill, and is, as babies so quickly do, showing evidence of suffering from want of fluid in its tissues. The pulse is usually rapid and the temperature subnormal. On examining the abdomen, there is usually tenderness, more marked on the right side, and abdominal rigidity exaggerated over the right rectus, which may be so troublesome as to necessitate an anæsthetic before anything further can be made out. The tumour is of very variable size and shape, and, only

rarely, is the typical sausage-shape tumour detected. In my experience, it is rather commoner on the right than the left side of the abdomen, while, in a fair proportion of cases, the tumour is umbilical in situation. Its position is some guide as to its extent, for an intussusception tumour, beginning in the ileo-cæcal region, passes through the right lumbar region to the right hypochondrium, and so by the umbilical to the left lumbar region where it is finally lost in the pelvis. I cannot trace any connection between this position and the duration of the trouble, although, naturally, those tumours, which have passed to the left side of the abdomen, are less easily reducible than those on the right.

In all but two of my cases a tumour was felt. These two were patients of 9 and 15 years of age, and do not properly come within the limits of this paper; both ended fatally. In two cases, the apex of the tumour entered the anal canal, and was there easily palpable on rectal examination. I cannot too strongly insist on this method of examination, combined with palpation of the abdomen by the left hand (the bimanual method recommended by Mr. Eve (*Clin. Journal*, 1899)).

By this, in a small child, one can easily explore the whole pelvis and much of the right and left iliac regions, and may not only feel an otherwise unnoticed tumour, but can also detect the absence of the cæcum from the right iliac region, which, in my opinion, is strongly suggestive of its presence, as a tumour, in another part of the abdomen. Treves says this (the Signe de Dance) is comparatively rare, but I must say I attach much value to it, and, as I always make a routine examination for it, find I can usually demonstrate this physical sign to those present. The most difficult cases, in which to feel the tumour, are those in which it is extensive, and in which, having passed into the pelvic colon, the intussuscepted bowel is coiled round the base of the mesentery, and is hidden behind the often distended small intestines.

The value of an anæsthetic, as an aid to diagnosis, cannot be over-estimated. It is my custom, at the Evelina and Guy's, when called upon to deal with a baby presenting symptoms suggestive of intussusception, to have the skin of the abdominal wall purified and compressed, and then to examine

it thoroughly under an anæsthetic, when an operation is promptly undertaken should the tumour be discovered.

On one occasion, I opened the abdomen after feeling a small tumour which I suspected was not an intussusception, and which turned out to be large mesenteric glands, with fortunately no ill-result to the patient, and I have heard of a similar confusion with a wandering spleen and a dependent lobe of the liver.

If the above precautions and methods of examination are carried out, no intussusception should escape detection, yet I have heard of one case in which an unsuspected intussusception was first discovered at the autopsy. The differential diagnosis is, on the whole, easy; the chief difficulty is the diagnosis from gastro-enteritis, the ordinary diarrhœa and vomiting of infants in crowded neighbourhoods. Perhaps the following points may briefly draw attention to what I think are the chief differential symptoms:—

1. The type of child; in gastro-enteritis, thin, flabby, wasted, and whining.

2. The sudden onset with acute pain, the amount of blood in the stools, and the abdominal tumour.

With the older children, in whom intussusception may be more chronic with acute exacerbations, the chief difficulty is in the diagnosis from tuberculous peritonitis with enlarged glands, or matted omentum, as in a case of a girl, æt. 9, in whom I resected the end of the ileum, cæcum, and the ascending colon, in the last stage of obstruction from intussusception, for which she has been under treatment for three weeks as suffering from tuberculous peritonitis.

Much has been written about the varieties of intussusceptions, really without much clinical interest, and I should not introduce the subject here except that it has bearing on one practical point, as we shall see when we come to the subject of treatment. Of my nineteen cases, rather more than half were of the ileo-cæcal type, which is usually regarded as the common variety (Treves, 44 per cent.), though recently, in an exhaustive article in the *Annals of Surgery*, Corner has attempted to show that this percentage is excessive.

The other cases are mostly double intussusceptions, that is, the invagination begins in the last few inches of the ileum, as

an enteric intussusception, and, reaching the ileo-cæcal valve either passes through it, or pushes the valve before it. One of my cases was enteric, and at least four began by an invagination of the caput cæci, and then ascended into the colon, drawing the ileo-cæcal valve and ileum with it.

Duration before Operation.—Of my cases that recovered the limits of duration were 5 hours to 45 hours; the two irreducible cases had existed 53 and 96 hours respectively. Gibson (*Annals of Surgery*, 1900) demonstrates, by statistics, that, after 48 hours' duration, the ease of reducibility rapidly diminishes, for he says that on the first day 94 per cent., and on the second 83 per cent., are reducible, but on the third only 61 per cent. may be so relieved.

Treatment.—While ready to admit that recovery has followed inflation with air, or injection of fluid through the rectum, yet I am strongly convinced that the ideal treatment is a prompt laparotomy. The arguments against inflation seem to me to be very strong. First, about 50 per cent. of intussusceptions are double, *i.e.*, a primary invagination of the ileum passes into, or through, the ileo-cæcal valve and carries the colon on with it. Inflation cannot in any way affect invaginated small intestine, as neither air nor fluid can be forced from the lungs to the small intestine through the valve. Secondly, it is most difficult to be sure that inflation has completed the reduction, as a small intussusception hidden under distended small intestines can with difficulty be palpated through the abdomen, and if reduction is incomplete, as evidenced by persistence of symptoms, much valuable time is lost. Thirdly, its danger, from rupture of distended or gangrenous bowel (D'Arcy Power). Yet when laparotomy cannot be promptly carried out, inflation has no doubt a place, not as an ideal, but as an expedient method of treatment. Of my nineteen cases, inflation was twice tried, and had failed in one case before I was asked to see it; but in all the others, the abdomen was opened as soon as a diagnosis was arrived at. I have no experience of laparotomy combined with inflation, as recommended by Kellock, in order to reduce the distal portion of the intussusception, for, in my experience, this is easy, and usually takes only a few seconds, and, if the invagination extends into the rectum, is much helped by

an assistant's finger in the rectum pushing it upwards. Again, the air or fluid used for this purpose can only add to the contents of an already distended abdomen, and so hinder the closing of the abdominal wall, which is usually the only difficulty in the technique. It is my custom to make a free vertical incision, large enough to admit the whole hand, either through the right semilunar line, or through the right rectus, with its centre just below the umbilicus. So far as possible, the escape of the intestines is to be avoided, for I think it adds to the shock, and reduction is sometimes troublesome. The intussusception is then searched for in the region of the ileo-cæcal valve, and, if not found there, the small intestine is brought out of the wound, and systematically examined as far as the duodeno-jejunal junction ; after which the large intestine is palpated from the cæcum downwards. When the intussusception is found, the apex is reached and the invagination quickly reduced by squeezing the apex towards the cæcum, and, until its reduction is becoming difficult, and the intussusception is felt to be fixed, all manipulation is carried out within the abdomen out of sight : then the cæcum is drawn out of the wound, and the manipulation continued, aided by traction on the entering ileum. If reduction is difficult, I push and pull with as much force as is necessary, paying no heed to rupture of the peritoneal, or even of the muscular coats ; yet I am well aware that most surgical text books regard traction on the entering bowel as a bad practice. Personally, my one object is to reduce the invagination, for I know that, if I cannot do this, the patient will die, as I believe there is no recorded case of recovery after resection, under one year ; so that, at the worst, forcible manipulation can only rupture the ensheathing layer and necessitate its suture, or an inevitable resection.

When an early intussusception is dealt with, the small bowel above the tumour often presents a curious flaccid, crinkled appearance, though, later, it gives place to paralytic distension. When this is marked, it is best to introduce a large trocar into the ileum, and milk out its contents from above, suturing the small hole with one or two Lembert's stitches.

The value of thus getting rid of the intestinal contents is not only seen in the greater ease, with which the abdominal

contents are returned to the abdominal cavity, but also because much of the toxic products, which even after a successful laparatomy may kill the child, are by this method eliminated. If time permits, I suture the abdominal wall in three layers, peritoneum and aponeurotic layers, with catgut, and the skin with silkworm gut: but if the patient is suffering from shock, a single silkworm-gut suture through all the layers is usually efficient. The greatest attention must be paid to delicate manipulation, and to avoidance of undue traction on the mesenteric plexus, and, above all, the utmost rapidity in operating must be insisted on, and every necessary instrument and suture must be prepared, so that no time may be lost. For an uncomplicated case, 20 minutes is usually ample to allow, from the time of incision, for the reduction of the bowel and suturing in three layers, and sometimes it can be carried out in 15 minutes or less.

After Treatment.—While the abdominal wall is being sutured, attempts are made to induce the child to take warm milk and water from a bottle, and the cot is then placed in front of a good fire with the foot raised. Strychnine, hypodermically, is sometimes necessary, and half a pint of normal saline into the axilla is frequently employed. Feeding by the mouth is begun at once, with peptonised milk, milk and water, or Benger's Food, and, after 48 hours, a full dose of castor oil is given, unless the bowels have already acted satisfactorily.

Results.—In one of my cases, the abdominal wound broke open on the 13th day after the stitches had been removed. It was resutured. I have also resutured the abdominal wound made by another surgeon for intussusception in a baby. Both made uneventful recoveries. Mr. Wallace (*Clin. Soc. Trans.*, Vol. XXXVIII.) records two similar accidents. Of my 19 cases, under one year, 15 recovered from the operation, and were discharged from the hospital. Of the four deaths, one, a child of nine months, who was operated on 34 hours after the onset of symptoms, died of shock and toxæmia 20 hours later. One, aged three months, of 53 hours' duration, died five hours after operation, at which the intussusception was found to be irreducible, and a Paul's tube was put into the ileum. One, aged eight months, had suffered from acute symptoms for four days, and from less marked symptoms for three weeks; the bowel

could not be reduced and was excised by Maunsell's method. He died five hours later. The last death suddenly occurred in a child, about eight months old, some days after the operation, from serous apoplexy. I have traced most of my other cases, and find that four have died; two of diarrhœa and vomiting, one of bronchopneumonia, and one of whooping-cough. Of the whole 19 cases, my mortality is 21 per cent., or, excluding the two irreducible cases, 11 per cent. I know of no statistics of cases, treated by inflation alone, giving a mortality in all cases of less than 50 per cent. Barker, to whom the greatest credit is due for bringing early operation into almost universal practice, gives, between 1892 and 1896, a mortality of 40 per cent. under one year. Sargent's statistics (St. Thomas's Hospital, 1892 to 1901) show, under one year, a mortality of 61 per cent. Wallace's 16 cases show a mortality of under 19 per cent., but he was fortunate enough to meet with only one irreducible case in his series.

Discussion of the methods to be adopted in irreducible cases is most unsatisfactory, as, under one year of age, no successes are recorded. I have performed resection for intussusception five times, of these four, all children, have died, and one, a man, with an acute exacerbation of pain and vomiting due to a chronic intussusception in the descending colon from a carcinomatous growth, recovered, so that I can make no suggestion as to what method gives the best chance of success in irreducible cases in infants.

PHYSICAL METHODS OF TREATING HEART DISEASE.

No. 2.

REST, EXERCISE, ELECTRICAL APPLICATIONS, AND MOUNTAIN AIR.

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REST AND EXERCISE.

In the treatment of cardiac inefficiency, the duty of the "spa physician" does not end with the prescription of a bath. That may be, and often is, only the commencement of affairs. Nor should such prescription be regarded as the invariable rule for the initiation of balneo-therapeutic measures. Rest in bed, active, or passive exercise, with, or without, electrical stimulation, may each, in different circumstances, be considered the most appropriate method of dealing with a case.

It is hard to over-rate the value of rest in the treatment of heart disease; at the same time, it is not always easy to convince a patient that it is but a step in the treatment, and that its object is a restoration of the fatigued heart and its exhausted nervous mechanism to enable him to return to an active life. There is no doubt, with many patients suffering from heart weakness, a degree of nervous apprehension which makes them feel that bed is, in reality, the only safe place, and which makes even the idea of exercise or exertion distasteful. In such cases, there is a very real danger of over-doing the treatment by rest, more as a result of the patient's too ready adoption of a line of treatment which commends itself to the less active side of his disposition, than on account of any failure of the physician to impress on his mind the rôle that rest is intended to play. It is easier for the medical adviser to adopt a policy of *laisser aller* than to combat this indisposition to bestir himself on the part of the patient. Such passive invalids are much more difficult to deal with than those of a more energetic and nervous type. The mere fact

of a passive attitude being so readily adopted seems to argue a lack of vital energy, which may in itself prevent the formation of a very hopeful prognosis.

It is hardly exaggeration to say that, in the majority of cases in which a patient knows himself to be the victim of heart disease, he goes in fear of sudden death. As a matter of fact, this method of termination is by no means so common as it is popularly supposed. The heart is a very long suffering organ, and, of all methods of death, the one which heralds its approach over the longest period of time is unquestionably that from heart disease. Death, whenever it comes, is sudden. The shock of departure is always fresh, but, in the sense that it has come without warning, the statement is based on a very flimsy foundation of fact. I know a long-distance cycle rider who rejoices in a marked mitral regurgitant murmur. Another hunting man of my acquaintance has both aortic and mitral regurgitant murmurs. They have both been dying for years. The fact is, that so long as compensation is good, their heart condition is merely an incidental disorder not worth their serious attention. So soon, however, as anything occurs to disturb the balance, they receive most undoubted intimations that, at such times, their life hangs by a thread. A few days' rest then pulls them together in a wonderful way, but the day will no doubt dawn when the inevitable will overtake them, and both may possibly be instances of sudden death from heart disease. Rest, in certain stages of heart disease, is imperative, and to be efficacious must be absolute. Timely rest will alone often be enough to turn the scales in favour of the invalid. When rest is ordered, confinement to bed, even though the recumbent posture is impossible, should be insisted upon. Weak, aimless perambulation of the room, with breathless clinging for support to various articles of furniture, is quite as much the physical expression of invertebrate despair, as is very frequently the querulous refusal to exercise out of doors.

Many people seem to imagine that the mere fact of remaining in bed is in itself sufficient, and will, when there, proceed to exhaust themselves fairly thoroughly by receiving hosts of visitors. Thereby not only prolonging their confinement, but neutralising the object for which the recumbent

position is prescribed. It is my belief that the nervous mechanism of the heart is the first to feel the strain of the battle to maintain circulatory efficiency; that the occurrence of œdema, and other evidences of back-working and valvular incompetency are an indication of exhausted nervous supply; that the utter exhaustion of the nervous mechanism is, in reality, the proximate cause of death, in every case of heart disease, whether sudden or gradual; and that a conservation of nervous energy is best insured by absolute rest in bed.

Before proceeding to prohibit visitors to the patient, one must remember that the absence of any form of communication with friends may, to some natures, prove so intensely irksome that the prescription may entirely defeat its own object, if too rigidly enforced. Where such a danger exists, visitors should be carefully selected from those, with whom the patient is in daily contact, and not friends, whom he has not seen for some length of time. The chance of excitement is thus diminished, the temptation to talk reduced, while, at the same time, the feeling of being neglected does not arise. Conversation should not be directed to the patient, but light and interesting topics introduced, such as will arouse the attention without creating mental exertion. It may seem a hard thing to say, but I have often noticed that, for an office of this sort, the husband or wife of the invalid is often the very last person who should be admitted into the sick room, at all events for long periods.

Domestic cares and business anxieties are too frequently the subjects, into which conversation is apt to drift, and, when the anxiety is pressing, the tendency is increased in proportion till at length it becomes irresistible. When such is likely to be the case, the visitor should go, armed with a newspaper or book, which may be read and commented on, without fear of introducing too much "local colour." In short, as much care should be exercised in the selection of visitors, as in every other detail of the sick room.

Gradually, as the patient is seen to be improving, conversation may be supplemented by passive exercise. The best form being massage.

In connection with the prescription of massage, there is one

point of more than theoretical importance which should engage our attention.

I mean the fact pointed out by Dr. Head, that stimulation of certain cutaneous areas gives rise to visceral reflexes. It has been found that the dorsal surfaces of the feet are in this manner associated with the pelvic organs, intestines, and brain. This fact may possibly account for the very severe pelvic pain, from which women are prone to suffer as the result of having wetted their feet during the menstrual period. Also for the relief of pelvic pain, which may be obtained, by immersion of the feet in hot water. Indeed, it suggests that what is commonly called a chill is in reality nothing more or less than a reflex nervous effect, and that, with the reflex hyperæmia of internal organs, there may be an actual lowering of vitality of the associated viscera. The coincidental presence of specific micro-organisms may then be the determining factors in the occurrence of pneumonia, typhoid, or other microbial diseases.

The heart itself is most readily affected by stimulation over the præcordium and scapulæ.

In those cases in which the patient is very weak, it is preferable to prelude the massage by one or two days electrical stimulation. The best method is to employ a moderately strong Faradaic current, applied by means of a fine wire brush or roller electrode, placing the stationary electrode over the first three dorsal spines. A slow regular upward sweep of the brush from wrist to shoulder should be given. Some people are most impatient of massage manipulations, for such nothing can be better than this form of electrical stimulation as a preparatory measure.

It is impossible to lay too much stress on the importance of prescribing massage exactly as it is desired to have it administered. Too frequently, this matter is left entirely to the discretion of the nurse or attendant. The fact is that the great majority of medical men have never troubled to familiarise themselves, either with the principles or practice of this most important, but much-abused therapeutic measure. When massage is ordered the prescriber should at least have some idea of what he is talking about, sufficient at all events to give the masseur the impression that he will be able to tell whether the suitable manipulations are being employed or

not. I do not hesitate to emphasise the need that exists for a wider knowledge of the subject on the part of practitioners generally, because, although I have seen a very large number of directions for the use of massage, I have never come across anything like a detailed description of what has been desired. To my mind, it would be just as reasonable to go into a chemist's shop, and ask him to make up the mixture, leaving the dose as well as the ingredients to his discretion, and then complain of the drugs and the compounder, because they had failed to hit the mark.

For the purposes of writing a practical prescription for massage, it is essential that the four principal varieties employed should be borne in mind. They are as follows:—Effleurage, Friction, Petrissage, Tapotement. Each, or the special variety of each, should be ordered as it may be thought expedient. Nor is this sufficient; the prescription should refer to the rate of movement, the degree of strength to be employed, and the period during which each manipulation is to extend.

There have lately appeared on the market various mechanical devices for the administration of massage. It is hardly necessary to say that no mechanical appliances can ever be an efficient substitute for skilful work. At the same time I am not going to condemn them, because I am ready to admit that there is one form of massage which may fairly claim to rival manual labour. In every other case, the chief reason for their existence is that they enable patients to operate upon themselves, and thereby to enjoy the feeling of complacency which seems to so often follow a self-prescribed or self-administered method of treatment. Where manipulative delicacy is important, their employment should not be countenanced. It may be as well now to briefly describe the characteristic features of the different forms of massage, and also to indicate the principal sub-varieties of each.

Effleurage.—A slow stroking movement with the palm of the hand, occasionally with the tips of the fingers, or the pad of muscles forming the thenar and hypo-thenar eminences. It should always be in the direction of the venous current. The degree of pressure exercised must vary with the object to be gained. As a general rule, in cardiac cases (and it must be remembered that it is with special reference to such that the

present paper is written) it should at first be only sufficiently firm to empty the superficial veins. The movement should be slow, about twelve times a minute for the length of the arm or leg. Pressure may be firmer on the arms than on the legs because there is less tendency to œdema in the non-dependent parts. It should not be prescribed in heart disease with the idea of mechanically displacing dropsical effusion. If removal of such fluid follows its use, it should be as an indirect result, viz., by hastening venous flow. It may be applied to the whole surface of the body, and may be the only form of massage employed. Skilfully and carefully administered, its use may be continued for quite long periods. The general result should be sedative. It cannot be too strongly emphasised that the rate, at which the movements are made, constitutes all the difference between a stimulating and sedative effect.

Friction.—Or rubbing in small circles with the thumb or tips of the fingers must not be confounded with effleurage. It is usually applied with moderate steady pressure over the præcordial area, the scapulæ, and upper dorsal spines.

Petrissage is performed by grasping the tissues to be operated on, lifting the mass thus seized, and alternately loosening and tightening the grasp. The finger tips should not be used, and the fingers themselves should not be separated. It is important that the grasp should be firm enough to move the skin with the hand. If the hand slips over the surface this is apt to cause considerable pain. It is a difficult movement to acquire. The variety of petrissage, most serviceable in heart disease, is that known as "fist kneading," and is employed for abdominal manipulations. Other varieties of petrissage may be used for the extremities, but only when there is no evidence of œdema, and when the patient is otherwise in a condition to stand some little exertion and fatigue. These are the various rolling and kneading motions. From the description of the way in which the tissues are to be seized, it can be readily perceived that the influence on the blood stream and lymphatic circulation is much more pronounced than in any of the other forms of manipulation. Occasionally it may be observed that a reflex contraction of the muscles undergoing manipulation takes place. When this

occurs, it is evidence either of too rapid movement, or of fatigue from too protracted a sitting.

The last remaining variety of massage, *Tapotement*, consists of a series of rapidly executed taps administered with the finger tips, flat of the hand, edge of the hand, or with the palm held in a slightly cupped position ; and in vibration.

It must never be forgotten that tapotement may be an exceedingly irritating measure, and that patients can very seldom endure it for more than a few moments at a time. It is a useful form of massage to be applied over the heart, dorsal spines, and scapulæ.

With reference to vibration ; it is only in the application of this form of massage that mechanical means can be employed with any advantage. They are then useful as a means of self-administration, and for the production of long continued, regular, and rapid vibration. The accomplishment of producing a regular vibration by means of the hands is the severest test of the skill of the operator.

In some measure, therefore, the mechanical contrivances referred to may have an advantage over a masseur, but the ability to measure the strength by the skilled hands of the dexterous operator is however absent, and must always be a more or less serious handicap, especially where delicate management is required.

Oertel, some years ago, introduced a system of massage, which he named heart massage. It consisted in pressure on the thoracic walls during forced expiration. The hands of the operator were placed in the axilla, and, with the expiration of the breath of the patient, were drawn down towards the costal margin, with a progressively increasing pressure. Its chief value lay in the forced expiration.

It is not at all unusual to commence a course of massage, having for its object the amelioration of the cardiac condition, with "fist-kneading" of the abdomen. The reason for this is the close connection which exists between the semilunar ganglia and the cardiac plexus. But I think it is better, in all the more serious cases, in which massage is employed, to commence with effleurage to the extremities. My reasons for saying this are :—

1. It is less liable to cause fatigue.

2. It can be repeated within an hour or two.

3. It affords both direct and reflex assistance to the overburdened heart: so much so that I have on several occasions relieved attacks of angina pectoris by gentle effleurage of the arms alone.

4. The patient does not resent the slight measures of preparation in the same way as he does the trouble and disturbance inseparable from abdominal massage.

5. Finally, it sometimes exerts a pleasantly soporific effect.

It is always advisable to give directions that œdematous portions of the body are to be left alone, as, although the œdema may be locally lessened, the chances are that the fluid is not absorbed, but merely displaced into internal cavities and viscera. Should any tendency to thrombosis be observed, it should be a sufficient contra-indication of massage.

The effects of abdominal massage have been summarised by Dr. Cautru as follows:—

1. It has a diuretic action whether employed alone, or in conjunction with the Swedish exercises.

2. In cardiac patients diuresis is rapidly induced, especially in cases of visceral and subcutaneous œdema.

3. The general condition improves as the circulation and urine assume more normal appearances.

4. Massage and Swedish exercises can produce increase, or diminution of pressure at the level of the heart and vessels.

5. Massage does not interfere with medication. It will, however, supplement the action of drugs, and may be alternated with them, or even replace them, should they become ineffective.

6. It is a truly physiological therapeutic measure.

Allusion has been made to the use of electricity as a mode of treatment wherewith to precede the more active measure of massage.

I have purposely refrained from mentioning it at greater length until now, although it may be considered that it would have been more suitably dealt with, when the action of the Nauheim Bath was being discussed.

I have, however, chosen the present time as the more suitable for two reasons. The first is that I frequently employ

massage and electricity in combination, the next is that I make no use of the electric bath as ordinarily understood. The form in which the electric bath existed until recently was that of a full reclining water bath. It was for some years a very favourite method of prescription, but I very much question whether its efficacy was due to anything else than the force of suggestion. However, suggestion is in itself such a very powerful factor in determining the success or failure of any line of treatment, that I should certainly not condemn it on such grounds alone.

It seems to me that several things have combined to make medical men chary of prescribing the electric bath. In the first instance, with the increase of knowledge on the part of medical men of the uses of electricity, there has been a corresponding increase of familiarity, on the part of the invalid public, with electrical appliances. Familiarity has bred, if not contempt, at all events indifference. Treatment by electrical applications and appliances has lost its first glamour of mystery. The first astonishing successes of this mode of treatment have not been habitually maintained in the various disorders for which it was prescribed. I believe I am right in saying that these electric baths were ordered (by no means infrequently either) as a means of cure for cataract, and that cases have been recorded in which such cures have taken place. On the other hand, I have myself successfully treated a patient by hypnotic suggestion for the same condition, so that I feel quite justified in expressing my belief in the possibility, more, in the probability, that the electric bath acted in a similar manner. But above and beyond all this, the confidence of medical practitioners has been shaken, and reduced almost to vanishing point, by the realisation of the fact that by far the larger proportion of electricity travelled through the bath water than through the body of the patient, and that what did pass, *viâ* the patient, was a current that completed the circuit with the least degree of penetration of resistance.

In some hydropathic establishments I have seen electrical apparatus of the crudest possible description; often consisting of nothing more than one or two Leclanche cells, an interrupting coil, a couple of metal electrodes, and a bath. The patient, if the mono-polar bath had to be administered, grasped

a metal bar, suspended from the ceiling, and in connection with the battery swung over the bath, the other electrode remaining in the water. I have seen these electrodes, labelled P and N respectively, when in connection with a Faradaic coil, and no galvanic battery available. Such a condition of things is not calculated to inspire confidence in the efficacy of electrical baths in the minds of those who know.

One great disadvantage of the mono-polar bath is that a patient, treated with a comparatively weak Faradaic current, may find the muscles of the arms thrown into a condition of violent contraction almost amounting to tetanic, as a result of the concentration of current upon the arms, which, in this case, represent the smaller electrode in proportion to the current distributed over the surface of the body, which represents the larger electrode. I speak from most painful personal experience. Just imagine what might be the result of such a shock on a nervous individual with a weak heart.

In the case of the di-polar bath, in which both electrodes are in the water with the patient, though not in contact with him, it must be remembered that the body of the patient introduces a greater resistance to the passage of the electric current than is presented by ordinary water. Consequently, that as the electric current takes the path of least resistance, the water conducts the current around the body of the patient, rather than through him. If any penetration of tissues exists at all, it must be of the minutest possible description. If, in order to overcome this cutaneous resistance, which has been estimated at 10,000 ohms, a very high voltage is employed, the danger of burning, by coming in contact with one or both electrodes of a galvanic battery, must be guarded against, as well as the danger of earthing the current through the body of the patient when getting into or out of the bath.

At Nauheim, in conjunction with the treatment there, I understand that they now employ an electric bath on the four-cell principle. As the body of the patient is interposed in the circuit, every milliampere registered is the amount which has actually traversed the body of the patient. I employ such a bath at Kingstown. My experience of it is not sufficient to justify me in saying more than that it presents many points of practical importance and advantage, and that

good results have apparently followed its use in one or two heart cases, in which I have given it a trial.

The cases, in which it has proved of service, have been those in which the myo-cardial degeneration has been severe enough to make the prescription of the Nauheim bath a matter of anxiety, and in which there has also been evident a lack of tone in the general muscular system. The current, which I have employed has been the sinusoidal high frequency, as this, owing to its reputed capacity for stimulating cell activity by its minute vibrations, and also its ability according to Schnee to influence the rate of the blood stream, appeared to me the most useful form to order. It is said also to have the power of lowering the blood pressure.

In certain cases, in which confinement to bed has still to be persevered with, I have found electrical massage of distinct service; the current, which I have then employed, being Faradaic. A portable form of battery is the dry cell Spamer coil. As the days pass, and the patient's strength improves, massage and electric applications may be supplemented by other forms of passive exercise. Their names will be a sufficient indication in most instances of the character of the movements: hand and foot flexion, and extension knee flexion, and extension flexion and extension of the forearms.

According to Wide, these movements are called depleting movements. The vessels, belonging to the muscles thus thrown into activity, require more blood, and so withdraw it from other congested areas of the body; at the same time, the movements do not demand increased efforts on the part of the heart itself. When a muscle is thrown into activity, whether active or passive, the blood-vessels of that muscle expand. It may thus be seen how greatly the work of the heart may be relieved by properly directed passive and active muscular exercises.

With a still further improvement in the patient's condition, active exercises should be commenced. They should at first be performed when he is lying in bed. Full extension of the feet and toes with gradual but complete subsequent flexion. Next the knees should be flexed and extended. Then abduction and adduction of the thighs. With a little practice, after a time the opposing muscles can be brought into play,

and be made to supply resistance to the movements of the different parts of the body described. Finally, flexion and extension of the forearms followed by abduction and adduction of the upper arms. At the end of a day or two, slight active resistance may be offered to these movements, but at no time should the respiration be allowed to become embarrassed, nor should the pulse remain quickened a half an hour after the exercise has ceased. On the contrary, the pulse should be slowed. It is satisfactory, if at first the pulse is found to be of the same rate as it was before they were administered.

When the patient is first allowed out of bed, these active movements should not be performed. The exertion of dressing should be sufficient for that day. Massage may, however, be continued as usual, but should be administered before the fatigue of dressing has been encountered. By these means, the patient is brought gradually to a suitable condition for the performance, out of bed, of the resisted movements of Dr. Schott, which should be the means of still further strengthening the myo-cardium. These exercises of Dr. Schott consist of nineteen separate movements, distributed in the following manner:—

The first five to the arms, the next three to the trunk, the next four to the arms again, the next four to the lower extremities, the next two to the arms and hands, and the last to the feet.

In this arrangement, it is remarkable what a very large proportion falls to the upper extremities. Eleven to the arms, five to the lower extremities, and three to the trunk. I draw particular attention to this point for the following reasons:—

That leg movements are those which a patient can best tolerate.

Oertel's system derives its chief importance from the leg exercises.

That Wide, of Stockholm, distinctly states that, in severe cases of heart disease, it is better never to give any other arm movements than those of kneading and rolling, while, in the latter, the precaution must be carefully observed (and remember this is in connection with passive movements) that the arms are never raised higher than the horizontal plane of the shoulder joints. The whole arrangement of the Schott

exercises, therefore, if one acknowledges the practical importance of these points, seems to me to presuppose and to require the presence of a certain degree of bodily vigour, and that they are not really suitable for very severe cases of myo-cardial debility.

As a matter of every-day experience, one knows that arm movements can render respiration difficult much sooner than leg movements can. The prolonged elevation of the arms above the head has been advanced as the explanation of the "strap-hanger's" vertigo. The maintenance of this position is said to check epistaxis by diminishing the supply of blood to the head. If this is so, the vertigo is explained: also the tendency to faint, which many artists' models evince when put into similar constrained positions.

The amount of space, which a detailed explanation of the Schott Exercises would take up, quite prohibits me from embarking on such a course. Moreover, they are so well known now that it would serve no useful purpose. I should, however, like to remark that one or two observers, at least, have expressed the opinion that all the movements are not necessary in every case, that the repetition of one or two only have often been sufficient to produce satisfactory results, and that some have seemed to do harm.

In view of what has been said, it would be interesting to know which movements have been found the most serviceable, and which have appeared to do harm. I have myself noticed that, when patients have had bad days, exercises 3, 4, 6, and 11 have seemed to be the most wearisome.

Seeing the very close relationship which exists between the heart and lungs, and how quickly the adverse condition of one reacts upon that of the other, I feel that some slight reference should be made to the action of the special exercises and manipulations, which have for their object an improvement in the functional activity of the lungs and the supply of blood to them.

It is a fact worthy of remark, that I have hardly ever come across anyone who has known how to breathe consciously in a natural manner. When attention has been specially directed to the effort, by a demand for a deep inspiration, I have noticed that almost invariably such a request is followed by a

fixation of the abdominal muscles and a heave upwards of the thorax.

In women, of course, diaphragmatic respiration is not natural to them to the same extent as it is to men, but, even when due allowance is made for the influence of sex, I cannot help thinking that the tendency to thoracic breathing is exaggerated, and is largely due to the presence of constricting bands around the waist.

In men, no such excuses exist, so that when they offend their offence is the greater.

Unless a man can exercise proper voluntary control over the respiratory acts, he can neither talk nor sing correctly, and breathing exercises, such as are practised as part of any system of physical culture, are apt to do more harm than good, unless the fundamental movements are studied and correctly performed. Normally, the mouth should be kept closed, and the air drawn in through the nostrils by the descent of the diaphragm. This action alone should be the one effecting the tidal change of air. The complemental air, or the amount of air capable of being inspired in addition to the tidal air, should be accounted for by the action of the intercostals, and perhaps the pectorals, and serrati raising the sternum and ribs. The shoulders and arms, as fixed points from which the latter muscles take their action, should not be moved in even the deepest possible inspiration in the normal individual.

Normally, expiration is not a muscular effort, but a recoil due to the natural elasticity of the lungs, thorax, and, probably also, of the abdominal walls. Muscular action only comes into operation for the purpose of expelling the reserve air, or that portion of the removable air left in the lungs after the expulsion of the tidal air.

By placing the hand over the epigastrium, and watching the movements, the action of the diaphragm can very easily be learnt, and after a while voluntarily controlled. The amount of air that, with a little practice, can be inhaled without moving the upper portion of the thorax, is quite astonishing. With the progress of inspiration, there is a decrease of pressure on the heart and large blood vessels, which causes a diminution of the intra-vascular pressure in the thorax. Blood is thus aspirated into the right auricle. This action is independent

of the diastolic suction of the auricle. The effect is to increase the amount of blood passing through the right ventricle, the lungs, the left auricle and ventricle, and finally the aorta, with the result that arterial tension outside the thorax is raised by inspiration and by diminution of pressure on the pulmonary vessels.

Expiration, unless forced, has very little influence on blood pressure. If, however, expiration is forced, the pulmonary circulation is obstructed, and blood pressure outside the thorax falls. With the fall of blood pressure, that is during expiration, the heart beats less rapidly. The left ventricle has a chance of emptying itself more thoroughly.

A consideration of these physiological facts gives the key to the *raison d'être* of Oertel's Heart Massage which has been described. They should also serve as guides for the after treatment of patients who have been through a course of Nauheim Baths, especially when it is desired to send them to high altitudes as is so frequently done. But in this connection, it is necessary to study not only the effects of variation of pressure on the circulation, but also on the blood itself.

As it is quite impossible to enter into a discussion of the experiments which have been made, I must content myself with a summary of the effects which, according to Tissier, have been noted, and which are admittedly correct. The respiration is quickened in proportion to the diminution of atmospheric pressure. Inspiration however is not deepened until the quantity of oxygen in the blood becomes insufficient. It is obvious that, with a diminution of pressure, a smaller amount of the gases of the atmosphere will be absorbed by the blood and by the tissues. This is the main alteration observed in the condition of the blood itself, but, as a consequence of this, there is a lowering of the temperature. The velocity of the circulation is not increased until the quantity of the oxygen is insufficient for the needs of the tissue cells. Then, when the heart becomes more rapid, the slightest exertion increases its rate arterial tension falls slightly, but only when a high altitude is reached.

From this, it will be seen that, unless the condition of the myocardium has improved, a stay in high altitudes is not an advisable measure to adopt. If it is decided that the

patient is in a fit state to make a sojourn amongst the mountains, it is important to see that the journey is performed in comfort. That the ascent is made gradually, and the patient not hurried to the desired altitude. That the visit should not be made at any other than summer time, because the external temperature also plays a part in determining the quantity of oxygen taken up by the tissues, while at other seasons of the year the presence of rain clouds and fogs would necessitate a high altitude, which might be altogether unsuitable.

From a consideration of the fact that the first feeling of oppression is occasionally observed in normal individuals at an elevation of 1,000 feet, it appears to me unnecessary, to order a patient abroad for the purposes of obtaining and ascertaining the effects of mountain air treatment, until it is known how such an altitude agrees with him. After a short time, he may proceed to higher levels, but I hardly think that it would be ever desirable to send a patient to a greater height than 6,000 feet ; at which elevation experienced mountaineers seem to be at their best.

In addition to breathing exercises, various contrivances have been invented for the purpose of enabling patients to breathe rarefied or condensed air as may be thought most expedient for them. The best of the older contrivances, with which I am personally acquainted, is Waldenburg's apparatus constructed on the gasometer principle.

The indications for the use of rarefied air are, all conditions of high arterial tension, palpitation, coldness of the extremities, tinnitus aurium, and headache. The ease with which patients can shirk the task of breathing into the apparatus and so avoid all pressure effects, requires such close observation of the mercurial "tell-tale" as to present very serious difficulties in the way of the prolonged use of the machine.

On the whole, I should prefer to trust to a mountain climate rather than to such a very artificial expedient as this ; the only portion of the body exposed to the effects of the low pressure being the lungs.

RECENT WORK ON TYPHOID FEVER.

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While during the past twelve months there has been no very marked addition made to our knowledge of typhoid fever, nevertheless there have been many interesting and suggestive contributions on the subject to the various medical journals, both at home and abroad. A brief review of some of these may be of some interest.

The Abdominal Reflex in Enteric Fever is discussed by Rolleston (*Brain*, Part CXIII., 1906). He points out that the value of this reflex, in clinical medicine, was first noticed by Rosenbach, but that, until recently, its investigation has been confined to nervous diseases. Muller and Seidelmann, however, after an examination of 3,000 persons, discovered that the abdominal reflex is present in all those who were not suffering from either nervous or abdominal disease. Jamin drew attention to its loss or impairment on the right side in cases of perityphlitis and cholecysitis. On the other hand, in less acute abdominal conditions, such as ascites, tubercular peritonitis, and tumours, the reflex could often be obtained. Other observers noticed that impairment also occurred in acute pelvic disease more frequently than in chronic. Sicard was the first to mention the condition of the reflex in typhoid fever. In observing the cases of 26 children he found it modified or absent during the febrile period in all but two cases. In some instances the loss of the reflex was unilateral, most frequently on the right side.

Rolleston bases his paper on the observation of 60 patients of all ages, certified, on admission to hospital, to be suffering from enteric fever. Observations were made daily during the acute stage. In 45 of these cases the diagnosis of enteric was confirmed. The remaining 15 suffered from other conditions, and in only three of these was the abdominal reflex affected. Two of these were instances of acute abdominal disease, suppurative appendicitis, and acute cancerous peritonitis respectively, and in both the reflex was absent, although,

in the first, it rapidly returned after the abscess had been evacuated. The remaining negative case was that of a woman, aged 54, suffering from lobar pneumonia, and in her case it would appear that the flaccid condition of the abdominal wall, the result of 12 pregnancies, together with her age, prevented the elicitation of the reflex.

Of the 45 cases of enteric, 42 showed impairment in a varying degree, 31 total loss of the reflex, which was unaffected in 3 cases only. In most cases the reflex was more or less impaired at the time of admission to hospital. Others, with the reflex active on admission, lost it completely as the fever progressed. In almost every case it was regained before discharge from hospital. As a rule it returned in the week, in which the normal evening temperature was established, but in some cases a little earlier or later. Rolleston thinks that, for practical purposes, it is advisable to adopt Oppenheim's division of the reflex into a supra-umbilical and infra-umbilical zone. In enteric fever the latter is the first to disappear and the last to return. The best method for eliciting the reflex is to stroke the abdomen rapidly with a penholder, and one or two negative results must be disregarded, as the patient, if nervous, is apt to hold the abdominal muscles.

Rolleston concludes that the abdominal reflex is affected in a very large number of cases of enteric fever. Since its absence, in persons under 50 years of age, is confined to certain nervous diseases and acute abdominal conditions, notably appendicitis and enteric fever, the absence of the abdominal reflex, in a given case of continued pyrexia, in any patient below 50, is of considerable diagnostic value. The transient nature of the affection of the reflex in enteric is in striking contrast to the more chronic affection of the knee and ankle jerks in diphtheria. Return of a lost reflex is a valuable indication of commencing convalescence. In reappearance of pyrexia in convalescence, the condition of the reflex is a valuable index of the nature of the pyrexia, as, if a relapse is impending, the reflex is again impaired. No constant relation exists between the condition of the abdominal reflex and that of the tendon reflexes. The frequency, degree, and duration of the impairment of the reflex are, as a rule, in direct proportion to the age of the patient.

I may add that, since reading this interesting paper, I have carefully examined the abdominal reflexes of all the cases admitted to the Edinburgh City Hospital, certified as enteric fever, and my observations have so far been in accordance with those of Rolleston. I am inclined to believe, with him, that we have here another symptom, which will, on occasion, be of considerable assistance in making a diagnosis of enteric fever. This fever is essentially a disease of young people, and the fact that, in persons over 50, the sign is not to be relied on, in no way impairs its value. I have noticed, with great interest, that, as a rule, the reflex returns last in the right infra-umbilical region, that being, as a rule, the situation in which the local condition is most acute. When appendicitis can be excluded, and there is no obvious nervous disease, the absence of the reflex, in a case of pyrexia, should make one think seriously of the probability of the case being one of enteric fever.

Massalongo (*Riforma Med.*, May 5th, 1906) draws attention to the occurrence, in typhoid fever, of sudden death resulting from *Embolism of the Pulmonary Artery*. He observes that this accident, which is rare, has usually been reported as occurring in connection with femoral thrombosis. The two cases, which he reports, did not however suffer from this condition, and in both he satisfied himself that the thrombus started from small mesenteric veins. Both cases, women of 23 and 17 years respectively, had progressed favourably, and had reached, in one instance, the stage of lysis, and, in the other, early convalescence. In neither was there any suggestion of the impending accident, and both died within a few minutes of the intervention of the symptoms, pallor followed by slight cyanosis, irregularity of the pulse, palpitation and sensations of suffocation.

The autopsy showed, in one case, an embolism of the main trunk of the pulmonary artery; in the other, that the branch to the right lung only was blocked. In both cases, the thrombosis could be traced through the inferior vena cava into the ramifications of the right iliac veins.

There was, however, also thrombosis of small mesenteric veins in connection with the lower part of the small intestine, the cæcum, and the colon. Massalongo considered that

the primary thrombosis took place in this situation, in direct connection with the characteristic lesions, and that, by the anastomosis, which exists between the portal system and the systemic circulation through the hæmorrhoidal and hypogastric veins, the infection spread to the small veins in the sacro-iliac region. Whether this theory is tenable or not, the cases are interesting as illustrating one of the causes of sudden death in typhoid fever.

The importance of supplying a liberal amount of water to typhoid-fever patients is being recognised more and more every day. Some twelve years ago, Débove, of Paris, succeeded in forcing 7 or 8 litres of cold water daily on his patients, and his results were extraordinarily good. Cushing and Clarke contributed last year a most interesting paper on "Copious Water-drinking and Polyuria in Typhoid Fever" to the *American Journal of the Medical Sciences* (February, 1905). Their observations were made in the wards of the Lakeside Hospital, Cleveland, Ohio. It had been customary, in that Institution, to give a minimum of 3 pints of water daily to each patient, and 40 to 50 ozs. of urine every twenty-four hours was considered a reasonable quantity. It was found that, without discomfort to the patients, a gallon to a gallon and a half could be easily taken. The method of administration was to give 4 ozs. of water every fifteen minutes during the waking hours, and, in this way, amounts, varying from 8 to 14 pints, were comparatively easily ingested. In addition, the patients had at least 3 pints of fluid, milk and albumen water, in the course of the day. The resulting diuresis was very marked, some 8 to 12 pints of urine being daily eliminated. In one case no less than 431 ozs. were passed in one day.

As the cases under consideration were also treated with the cold tub-bath, on the lines so usual in American hospitals, it is obvious that a great strain was put upon the nursing staff. But the nurses maintained that baths had not to be given with nearly the same frequency as formerly. The cases, in which polyuria was established, showed more lasting remission of temperature, with less call for the bath. Such symptoms as headache, restlessness, delirium, and other toxic manifestations were very much less in evidence. Com-

plications were few. Meteorism, alone of the distressing symptoms, which may occur in typhoid fever, seemed more common, but it is not stated that it was present to a dangerous extent.

Cushing and Clarke give an interesting comparison of the mortality and complications of a series of 105 cases, treated in this manner, with a series of cases treated on ordinary lines at about the same period, and with yet another group of 373 cases, treated during the previous year. The duration of the fever remained the same, and there was no difference in the proportion of relapses. One case of perforation and ten of hæmorrhage occurred, there being no reason to believe that the percentage incidence of these complications was in any way influenced by the treatment. Only one case of phlebitis occurred, a much smaller proportion than in the control cases, and, in reference to this, it is suggested that the copious water drinking may possibly lessen the tendency to the formation of agglutination thrombi. The mortality of the 105 cases was 5, or practically 5 per cent. And it is here noted that of the patients, who passed, on an average more than 160 ozs. per diem, the death-rate was only about 2 per cent., a higher mortality obtaining among those patients whose average elimination did not reach that amount. A similar observation was made as regards the occurrence of hæmorrhage, which was very much more frequent in the patients, whose polyuria was, so to speak, limited. The authors conclude that this mode of treatment may reasonably be expected to combat the toxæmia, and to diminish the severity and mortality of typhoid fever.

Sollmann and Hoffmann (*American Journal of the Medical Sciences*, February, 1905) study the question of *Chloride and Water Excretion in Typhoid Fever with copious Diuresis*, having made their observations on cases treated by Cushing and Clarke. They conclude that the excretion of this enormous quantity of fluid is conclusive proof that the kidneys are not appreciably injured by typhoid fever, or by prolonged diuresis. The kidneys also remained very efficient in the excretion of material. The specific gravity was very low, corresponding with the low molecular concentration. The curves for the income and output of fluid daily strictly corresponded. The

kidneys were, therefore, equal to the not inconsiderable task of eliminating, per day, 9 litres of urine of a very low molecular concentration. Otherwise, an accumulation of fluid in the body would have occurred, and the urine excretion would have exceeded the income whenever the latter was reduced. An interesting table is given showing how closely the income and output corresponded. In two cases, a marked difference in amount between the ingested fluid and the urine was readily accounted for by the fact that these particular patients suffered from very free perspiration. One of them, indeed, must have lost by the skin 4,000 c.c. per day more than the other patients. It is suggested that perspiration is probably much more free than usual when water is taken in such large amounts, and that this is, in itself, a point in favour of this mode of treatment, as it must exercise a considerable anti-pyretic effect. The authors believe that fever has little influence on the elimination of urine, except indirectly by influencing perspiration. Curiously enough the administration of diuretics rather diminished than increased the amount of urine excreted.

As regards the excretion of chlorides, it was found to be low, both as concerns the quantity per day and per litre. A lessened excretion of chlorides is the rule in typhoid fever. In order to ascertain the effect of the polyuria, it was necessary to compare these cases with others, in which only an ordinary amount of water had been administered. It was then found that a polyuria, of about five times the normal, increased the elimination of chlorides to about three times the normal, while it diminished their quantity per litre to about one-third. Perspiration, even if profuse, has no effect on the amount of chlorides excreted. Almost every change in the chloride income causes a corresponding change in the chloride elimination. There is apparently little or no retention. This correspondence of the income to the excretion is unusual, and must be attributed to the polyuria, which perhaps tends to reduce the chlorides in the body to an extreme minimum, causing a ready elimination of any excess. It may be noted that the chlorides always drop to about 2 grammes per day, within three days of the inauguration of the milk diet, and increase again when the patient is placed on convalescent diet.

The authors calculate that the average chloride income on a milk diet is about 2·4 grammes of sodium chloride. On this assumption, they found that an ordinary typhoid patient retains 1·8 grammes per day, the polyuria typhoid patient about 0·7 grammes, and a normal individual about 1 gramme. The conclusion seems justified that the polyuria is able to counteract the excessive chloride retention in fever. Further they state that the prolonged restriction of the chloride income appears to produce no deleterious effects, and that the patients do not develop any salt hunger.

This absence of salt hunger is hardly in accordance with my own experience. For some years I have been forcing water on typhoid patients, and have endeavoured latterly to set up six pints daily, as an ideal to be attained to by the nurses in the wards. I find that, in most cases, this amount can be given without unduly troubling the patients, though, in some instances, we have to be content with a total daily amount of 4 pints. It is to be understood that, in addition, the patient takes about 3 to 4 pints of fluid in the form of milk and beef-tea. I cannot say that salt hunger has been found to be more marked than usual, but, in my experience, every typhoid patient on a milk diet has a great craving for salt, which he expresses by his curious desire for salted articles of food, such as salt herrings, ham, and even fresh eggs, which are always eaten with salt. This "false appetite" is, I find, best treated by giving the beef or chicken tea much more salted than an individual in health would relish it.

Of the great value of forced water ingestion in typhoid fever, I have no doubt whatever. The blood is, so to speak, washed out, and one may reasonably assume that the toxins are diluted, or lessened in quantity. Clinically, this is illustrated by the marked diminution of the toxic symptoms, delirium, subsaltus, insomnia, headache, etc., which nearly invariably ensues. On this point my own observations are in complete accordance with those of Cushing and Clarke. It would appear, from the conclusions of Hoffmann and Sollmann, that any extra income of chlorides in my cases would be counteracted by a corresponding increased excretion. Otherwise I should doubt the wisdom of continuing to supply extra salt to my patients, in a disease in which chlorides are

admittedly retained. It is satisfactory to learn from their paper that the polyuria counteracts to some extent this tendency. It would be interesting to know, if administration of large quantities of water could possibly weaken the resistance of the human organism, by diluting or washing away protective substances. So far it would seem that such an objection must be purely theoretical, as the improvement in the toxic symptoms is a feature of cases treated by this method. It is interesting to remember that much of the advantage of the cold-bath treatment is attributed to the free diuresis, which is caused by the baths, and we may possibly, by establishing polyuria, obtain the same results as that treatment, and yet suffer from none of its disadvantages.

Todd (*Medical Record*, April 14, 1906) considers that free diuresis soon exhausts the system of its salts, which are necessary to preserve the integrity of the blood plasma, and for the function of the leucocytes. As a result, the exhaustion of the salts from the blood tends to cardiac arrest. In order to counteract this tendency, he advocates the free use of *saline beverages*, his formula being sodium chloride gr. x., potassium bicarbonate gr. v. in 8 ozs. of water. A teaspoonful of lemon juice is added, which produces a mild effervescence, and renders the drink very palatable. The draught is given every two hours, so that approximately five pints would be given in the day. Todd firmly believes in the supply of a sufficient amount of water, his main object being apparently to increase the dissipation of heat, which he points out is accomplished, to a very great extent, by the elimination of water through the lungs, skin, and by urine. The fluid is rendered saline, with a view of preventing the exhaustion of salts in the system. He says that there is unanimity in the opinion as to the necessity of the alkaline salts in the blood for its efficacy, and that any treatment of febrile disease is defective, if due regard is not paid to maintaining the alkalinity of the blood. He is urgent that this treatment should be carried out from the first, in order to preserve the antitoxic properties of the blood and cells. He objects to hypodermoclysis, as being not physiological, and considers that to use the solution by enema is to promote the absorption of intestinal bacteria and toxins, an objection which seems theoretically sound, although in my

own experience of the use of large enemata, I have never, with the exception of evanescent rashes, noted any signs of increased toxæmia. On the other hand, he contends that, in the stomach, sodium chloride solution is better absorbed than water. It may be remarked that, as has been said above, Sollmann and Hoffmann found that an addition to the chloride income caused an additional output, so that after all the added saline is promptly excreted. This, however, does not invalidate Todd's contention that it is useful while it is actually in the blood. As regards the dissipation of heat, Todd's observations, as tabulated, show that when the water was given in the form of an antiseptic solution, presumably acetozone, at least as much heat, on an average, was dissipated in the urine as in the cases in which saline beverages were administered.

Taken together, these three papers form a most interesting addition to the literature of the subject, and it is to be hoped that copious water drinking, either with or without the addition of saline, will be given a fair trial in the treatment of the disease.

Eccles (*Medical Record*, August 11, 1906) has an interesting paper on the causation of typhoid fever. *Does the drinking of water give typhoid?* At this time of day, the question seems at first sight an extremely heretical one. But the author does not deny that typhoid germs are carried by water and, by means of water, may infect milk and various articles of food. His contention is, that few specimens of drinking water will contain such a quantity of germs that the human stomach is not capable of dealing with them. The report on the militia camps, in the United States, during the Spanish-American war, emphasised the importance both of personal direct infection and infection from food contaminated by flies. Eccles apparently lays much greater stress on this latter cause, which undoubtedly constitutes a very real danger in modern war, and also, to a less degree, in disseminating this disease in city life. While the importance of drinking water in this connection has been doubtless very much exaggerated, we can hardly follow Eccles in his contention that drinking water never causes typhoid fever. He states that "a diligent search of the literature of the disease has failed to reveal any evidence whatever that the drinking of water ever caused

a single case, that the drinking of water could possibly start a case, or that there are any indications pointing to the possibility that spring, well, river, or hydrant water can reasonably be charged with having started any particular case." His argument appears to be that a polluted source contaminates the food, and that it is in food, such as milk, that the germs have a real opportunity of multiplying sufficiently to be dangerous as a dose. It would appear that he does not regard this multiplication in the food as possible in the stomach. We take it that his point is, that the food is always contaminated outside the body. If not, it is surely splitting hairs to say the drinking of water does not cause typhoid. But surely the medical literature of this country can show instances of infection from water alone. Without looking up the literature, one such case, from which other possibilities were carefully excluded, at once occurs to me. In 1897, Dr. Thresh reported a most interesting little outbreak due to specific water pollution (*Lancet*, March 6, 1897). In this case, four children, who were accustomed to drink from a particular spring by the roadside on the way from school, developed the fever. Contamination of the spring by the drains of a small local hospital, in which a single case was under treatment, was conclusively proved, and the typhoid bacillus was found in the water. The inhabitants of a cottage close by, which depended on the spring for its water supply, were also infected, but, so far as they are concerned, Dr. Eccles would no doubt contend that their food was contaminated by the water. As regards the children, however, the case is different. They merely drank at the spring in passing; there were no other cases in their families, and we can only conclude that they were infected by water alone. A similar instance was reported by Janchen (*Wien. klin. Wochenschrift*, July 7, 1898). A company of soldiers, on a route march, drank water offered them by the inhabitants of a village in which typhoid was epidemic. Of 36 men infected, all developed symptoms within a fortnight of this particular day's march out, and there were no subsequent cases. Here again it is difficult to exclude the hypothesis of water alone as the cause. The main interest of Eccles' paper is that it shows the modern tendency to look beyond the water theory for the causation of typhoid fever,

There is no doubt whatever that we cannot hope to find safety from typhoid by boiling water alone. The gospel of the tea-kettle, as the late Mr. Ernest Hart used to call it, is exploded. We must recognise the importance also of dust, of flies, and above all of personal infection, particularly among troops in the field. But that is no reason for not believing also that water is responsible, and alone responsible, for many outbreaks of the fever.

Deaver, in an article on surgical intervention in the biliary tract (*Journal Amer. Med. Assoc.*, August 11, 1906), refers to the question of *Typhoid Cholecystitis*. Out of 216 patients with cholecystitis, there were seven from whose gall bladder the typhoid bacillus was isolated. In four of these, no history of previous, or concurrent, typhoid fever could be obtained. Deaver thinks that, unless there is direct evidence of suppuration, it is advisable to treat patients, in whom signs of cholecystitis arise during the fever, on medical lines. He notes that the gall bladder is not infrequently found to be enlarged and tender while the disease is acute, and is surprised that, in cases of gall-stone disease, there is not more frequently a history of previous typhoid fever. In patients, who have shown signs of cholecystitis during the attack, he advocates a subsequent cholecystostomy after their recovery, should any symptoms persist. By this, he considers that future disease of a serious nature might be prevented. There is much to be said for Deaver's plea that the previous history of patients with disease of the gall-bladder should be more carefully inquired into, and its relationship with typhoid fever ascertained.

Kinnicutt (*Boston Med. and Surg. Journal*, July 5, 1906) writes on *The Principles of Feeding in Typhoid and other Fevers*. He makes a comparison of the diets advocated by Shattuck, Marsden, and Bushuyev. Of these, the most liberal is the latter, as it includes cutlets and chicken. Kinnicutt seems to prefer that of Shattuck, which consists mainly of soups and mixed soft diet. He has treated 74 patients with good results in this manner. His objection to the milk diet is its monotony and the difficulty of giving what he considers sufficient. Personally I have always found that, except in cases of very prolonged pyrexia or of relapse, a milk diet, supplemented only by chicken or beef tea, is quite sufficient.

The great necessity is to give the milk regularly, and not to attempt to give too much. On the other hand, I think, the diet is usually not increased nearly soon enough after typhoid fever. My own patients get soft solids as soon as the morning temperature is normal, and, provided that there is no morning rise as an apparent consequence of this addition, they are rapidly promoted to fish and chicken, even if the evening temperature should still be elevated. Kinnicutt's paper is welcome, as it illustrates what can be done in the way of liberal feeding without injury to the patient. An interesting feature of it is a table showing the comparative results of orthodox and liberal dietaries, under the same general treatment, in the same hospitals. He summarises his figures as follows:—

	Cases.	Percentage of			
		Relapses.	Hæmorrhages.	Perforations.	Deaths.
I. On liberal diet - -	733	11·38	4·77	1·36	9·47
II. On orthodox fluid diet	4,654	10·89	8·83	2·40	10·55

If figures can prove anything, the above certainly prove that patients do equally well on a diet which is not exclusively fluid. It is interesting to note that the ulcerative accidents were less in the liberally-fed cases, both hæmorrhages and perforations being of less frequent occurrence. This may be due to the better nourishment of the bowel-wall. Relapses were only very slightly more frequent. This accords with my own experience of liberal feeding in early convalescence, which I find does not increase their occurrence.

Antiseptics in Typhoid Fever find a champion in Landers (*Medical Record*, June 2, 1906), who has been accustomed to use the sulpho-carbolates of lime, sodium, and zinc with good effect. He finds that they deodorise the stools, and lessen the toxic symptoms, and I understand him to suggest that they shorten the duration of the fever. I have had no personal experience of the sulpho-carbolates in typhoid fever, although I have employed them without success in scarlatina, but, after a prolonged trial of different antiseptics, I found none which

shortened the course of the disease. Still, I feel that Landers is taking a perfectly sound position when he says that antiseptics should not be condemned because they do not work miracles. Those of us, who believe that something may be done to cleanse a filthy intestine, do not necessarily claim that we are curing typhoid fever by a specific remedy, and I have no sympathy with those writers who condemn antiseptics in an offhand manner because they fail to prevent the occurrence of death, or of hæmorrhage. Landers also believes in augmenting leucocytosis by the administration of nuclein, and considers that, by an increase of phagocytic activity, the bacilli and their toxins are more readily dealt with after they invade the tissues. As regards diet, he is content to say "that the patient should have a diet which he can handle and appropriate," a dictum which we commend to practitioners who prescribe the same diet to all their patients on cast-iron principles. His main object is to clean and keep clean the *primæ viæ*. He concludes, optimistically, that treatment on these lines "will supplant the hopelessness of nihilism, and lift the Cimmerian clouds of pessimistic despair, and give the cheering hope-inspiring sunshine of optimism portending the more auspicious, gratifying, confident therapeutics which we ardently and fervently hope may ultimately prevail."

It may be noted that the text of the above paper of Landers' is the plea of Ewart (*Brit. Med. Journal*, December 9, 1905) for the "clean bowel." I have already elsewhere (*Ed. Med. Journ.*, July, 1906) discussed this paper at length. Suffice it to say that Ewart's object is to prescribe a diet which leaves little or no residuum in the bowel, and, at the same time, to secure an antiseptic action by small doses of calomel, by the administration of charcoal, and by the use of liquid paraffin. There is, doubtless, so much unnecessary absorption of septic, as apart from toxic, material from the bowel of typhoid patients, that it is hard to resist the conclusion that treatment on these lines is both logical and likely to be successful.

A CONTRIBUTION TO THE ÆTIOLOGY OF TYPHOID FEVER.

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It is proposed in the present paper to briefly discuss some of the ætiological factors in the incidence of typhoid (or enteric) fever.

Seeing that it is possible for the bacillus typhosus to be inhaled, and to excite pulmonary pathological conditions without any obvious intestinal lesions, it is questionable whether the term enteric fever should be used as an invariable synonym for typhoid fever. The idea that should be firmly grasped, however, is that typhoid fever is a septicæmia, and that the point of entry of infection may not always be by the intestinal tract. True, it is almost invariably by way of the alimentary canal, though, in a large proportion of abdominal cases, there is, in all probability, a simultaneous invasion viâ the tonsils and the respiratory organs. This would explain satisfactorily the frequent concomitant occurrence of epistaxis, tonsillitis, congestion of the pharynx, and bronchitis (or bronchopneumonia), among the early symptoms of typhoid fever.

Typhoid fever may occur at any time of the year, but, from an epidemiological point of view, it is undoubtedly a distinctly seasonal disease with maximum and minimum times of incidence and mortality. The seasonal incidence of a disease at once opens up a promising field of inquiry as to the ætiological factors at work. It is a question of philosophical interest to inquire why there is an autumnal maximum in the incidence of typhoid fever? And why a minimum in the months of May and June? The autumnal rise is of more particular interest, because it is more marked in character than the early summer minimum.

In a contribution[1] to the Epidemiological Society of London, in April 1903, I suggested what to my mind appeared to be a most important factor in the autumnal incidence of typhoid fever in this country, and my experience during the

[1] *Trans. Epidem. Soc.*, N.S., Vol. XXII., p. 110.

three and a half years which have since elapsed, confirms me in the belief that the explanation I then ventured to suggest is a very real one.

Briefly, that factor on which I then laid special stress was the great increase in the consumption of shell-fish (particularly oysters and cockles) in August and September. I pointed out that, in most seaside towns, there was a marked increase in the incidence of typhoid fever between August and October, while, in the metropolis, the seasonal incidence was rather later in reaching its height. This incidence coincides in point of time with the greater consumption of shell-fish in seaside resorts during the holiday season in August and September (which "season" then rather abruptly terminates), while shell-fish consumption continues to increase in London during October. It must not be forgotten that the season for native oysters commences on August the 4th. On the other hand, the months of minimum incidence of typhoid fever correspond with the "close" season for native oysters.

The incidence of typhoid fever in a favoured south coast town is in prominent contrast to that of most seaside resorts, showing a high incidence in that town in December. This town is coincidentally in contrast with most other seaside towns, in that she enjoys a very distinct "season" in December both as to visitors and shell-fish.

In Southend, my experience is such that, by very careful investigation and re-examination, I have been able to trace a shell-fish history in at least 80 per cent. of the cases which have occurred in this town during the five years I have been medical officer of health.

Though I made some allusion to shell-fish (including cockles) as a probable cause of the majority of the local cases of typhoid fever in my Annual Report on the health of Southend for 1901, and, though my predecessor had noted a history of oysters in a small percentage of the cases occurring between 1897 and 1900, it was not until June of 1902 that I was in a position to adduce sufficient evidence to incriminate "cooked" cockles as a very definite source of typhoid fever.

This fact revealed a much larger connection between typhoid fever and shell-fish than had been suspected, when, prior to

this, attention had been directed almost exclusively to oysters. A few weeks later, I became aware of the results of Dr. Klein's experimental bacteriological results with scalded cockles. These experimental results entirely corroborated the conclusion at which I had already arrived on epidemiological evidence alone. I mention this as an interesting fact, that, in Southend at any rate, scalded cockles from a polluted source were unequivocally condemned on epidemiological grounds before any bacteriological experimental observations were known to me. Locally, at all events, the causal connection of semi-boiled cockles, from a polluted source, with an outbreak of typhoid fever was definitely established on epidemiological evidence, though subsequently found to be amply confirmed by bacteriological investigation, and by Dr. Klein's published experimental data.

As cockles constitute the form of shell-fish indulged in by the masses, and are sometimes referred to as "the poor man's food," or "the plebeian cockle," it becomes evident that causal connection between contaminated cockles and typhoid fever being definitely established, a very much wider field for "preventive" measures became available than had hitherto been the case, when attention was centred on oysters alone. Probably the reason why cooked cockles were not earlier incriminated, is that it was mistakenly imagined that the plunging of cockles into boiling water, which killed the cockles, also proved fatal for the typhoid germs.

In September 1902, I read a paper at Manchester on the subject of shell-fish and typhoid fever. In November and December 1902 occurred the memorable outbreaks of typhoid fever at Winchester and Southampton, and the attention of the public was thus prominently and repeatedly, at that time, directed to the dangers of shell-fish. It is interesting to record that, since 1903, the incidence of typhoid fever in London and the South of England has waned.

In my own borough, apparently as a result of the adoption of preventive measures in connection with the more careful collection and cooking of cockles, and the exercise of greater care in the selection of oysters, there has of late been an astounding diminution in the incidence of typhoid fever. The incidence rate, which had previously (since annual records were published) never been less than 1·5 per 1,000 population,

and had indeed averaged 4·7 per 1,000 persons for the eleven years 1893 to 1903, declined, in 1904, to 0·2 per 1,000 population, and this diminution has been approximately maintained to the present time.

When the incidence rate of a disease like typhoid fever is suddenly reduced to a twentieth, or even a fifth, of its previous regular average annual prevalence, it is fair to assume that a most important factor in its previous prevalence has been successfully discovered, and fairly satisfactorily dealt with.[1]

But though the evidence is strongly in favour of the consumption of infected shell-fish being one of the principal factors in the autumnal prevalence of typhoid fever, it is equally obvious that there are many other factors to be taken into consideration.

Foremost among them is the seasonal prevalence of *flies*, particularly in August and the first part of September. Further, there is the greatly increased consumption of uncooked salads or other vegetables and fruits, and the increased consumption of ice-cream, milk, ordinary and aerated waters. Last, but not least, there is the great holiday season when persons sickening with, or convalescent from, typhoid fever pass to and fro, too often leaving typhoid germs behind them.

With regard to the part played by *flies*, this, in common with the part played by shell-fish, has generally been very much under-rated in the past. In spite of all that has been said and written on the matter during the past three years, the paramount influence of these agents is even now ignored, or not appreciated in many quarters. Thus in the *Lancet*, of August 25th, 1906, page 528, a correspondent, writing on typhoid fever in Belfast, hopes that "the cause of this outbreak, whether milk, water, or defective drains, will be found out promptly." Evidently this writer is among those who have

[1] It is only right that I should here state my opinion, based on considerable experience, experiments, and consideration given to the question, that oysters and other shell-fish are in themselves under pure conditions perfectly harmless; and, moreover, are not likely to suffer *dangerous* pollution if laid in a broad estuary a mile or more from any sewage outfall, or from any anchorage for ships or boats. Where, however, shell-fish are laid in a narrow channel *below* a sewage outfall, or are so situated that a discharge from a sewer outfall *must*, by the limitation of narrow banks, course over the layings in a more or less diluted condition, a distance of a mile would not be sufficient in order to eliminate danger.

not yet appreciated the possible epidemic influences of shell-fish and flies, either, or both of which, may be at the bottom of the Belfast outbreak at the present time,[1] which is indeed the season for both flies and oysters.

In special reports on epidemic diarrhœa, in my Annual Reports since 1902, and in various contributions to learned societies and to medical journals,[2] I have insisted upon the paramount importance of the common house fly in the origin and spread of diarrhœal diseases, more especially epidemic enteritis, and typhoid fever. As regards the former disease, viz., epidemic enteritis, the evidence, accumulated year by year, almost impels one to state as an axiom that the amount of epidemic summer diarrhœa will be found to vary directly as the numerical strength of flies.

In other words, when there are numerous flies there is much diarrhœa; few flies, little diarrhœa; no flies, no *epidemic* diarrhœa.

Epidemic diarrhœa, though prevalent in most districts, is not prevalent in all. It is, indeed, largely a local disease in each sanitary district, confined almost wholly to well-defined limits in each sanitary area. Other large districts under the same sanitary authority may escape altogether, or suffer but slightly; certainly not in an epidemic sense.

Now if epidemic diarrhœa was due to temperature alone; to poor class infants foods alone; to polluted milk supplies in general; or all of these combined; we ought not to see this patchy distribution of summer diarrhœa.

I have, in previous contributions,[3] attributed this patchy distribution to the relative amounts of organic refuse found in each district, and the consequent relative breeding and multiplication of flies. In order not to unduly repeat myself, I must refer those interested to former papers on the subject.

I wish here only to emphasise the connection between refuse heaps, midden privies, and seasonal typhoid fever and diarrhœa, through the seasonal prevalence of flies. Other factors in the seasonal incidence of typhoid fever, and of diarrhœa, are undoubtedly the increased consumption of

[1] August.

[2] *Trans. Epidem. Soc., loc. cit.; The Hospital.* 1903. *The Lancet*, 1904, Vol. II., and 1905, Vol. II., etc.

[3] *Vide* THE PRACTITIONER for May, 1906.

uncooked vegetables in the forms of salads and watercress, chiefly on account of dangerous methods of cultivation of these edible plants. Uncooked fruit is yet another factor, not through unripeness or over-ripeness, but through being exposed to much handling, and lying exposed to dust and flies in frequented thoroughfares. The increased consumption of ice-creams is unquestionably another factor, especially in any district where there is inadequate supervision of the methods of manufacture and storage. The same applies to milk, and more particularly to milk sold by small general dealers.

The larger consumption, during the hot season, of waters of unknown origin (including aerated waters) by excursionists, trippers, Sunday-school treats, beanfeasters, etc., is also possibly in a small degree a factor in the seasonal incidence of typhoid fever quite apart from proven instances of specific infection.

A factor of extreme importance in the seasonal incidence of typhoid fever, and one which is often overlooked, and is certainly not sufficiently appreciated as yet, is the large proportion (25 to 30 per cent.) of convalescents from typhoid fever, who suffer from typhoidal bacilluria.[1] These convalescents travel to seaside and other health resorts, voiding urine teeming with millions of virulent typhoid bacilli on the way, and after arrival. In the absence of appropriate treatment, warning, or instruction, myriads of active typhoid bacilli, from each such convalescent, may specifically pollute either drinking-water supplies, or water used for washing milk cans, etc., or shell-fish laid in improper positions, or watercress, or other vegetables and fruits, radishes, salads, strawberries, etc., eaten in an uncooked form. Drops of infected urine on linen become dried, and the contained typhoid bacilli may be transferred directly to the housewife, housemaid, or laundry maid; or flies settling on contaminated linen or vessels may easily convey the infection to adjoining houses. Many an untraced case of typhoid fever, particularly in the fly season, in my opinion, owes its origin to one or other of these causes.

[The obvious lesson appears to be that the administration of urotropin, in ten-grain doses for a few days before discharging a convalescent typhoid fever patient, should be an almost invariable part of the treatment of a case of typhoid fever.]

[1] Horton-Smith. Goulstonian Lectures, 1900.

It is frequently impossible to trace the origin of the first case in an outbreak of typhoid fever in a district which has for some time been immune. It is conceivable that an unknown typhoid convalescent visitor is responsible for the primary infection. All convalescents from typhoid fever should be warned of the possible infectivity of the urine for a considerable time after recovery, so that due care may be taken. In my own experience, I have had reason to suspect a trooper, who had suffered from typhoid fever in South Africa a year previously, as the source of two cases of typhoid fever. In hot dry weather, the dangers of carelessly, or innocently voided infected urine are enhanced through flies and dust.

Though personally inclined to believe that the typhoid bacillus is a highly specialised form of the colon bacillus, yet I am of opinion that all the necessary conditions of environment, etc., necessary to bring about the conversion of the one into the other, must only rarely happen in proper conjunction or sequence; so rarely indeed, that it is almost an axiom that an outbreak of typhoid fever in a district hitherto immune is due to the introduction into the district of the highly specialised bacillus from without, and often through an untraced, or unknown, convalescent from typhoid fever.

From this point of view, all the cases occurring in a district, whether infected through water, milk, shell-fish, other fish,[1] watercress, other vegetables, dust, flies, or what not, are secondary cases. But the term secondary is generally and properly reserved for those cases, in which there is no doubt as to infection from a recent case of typhoid fever, as when someone, in attendance upon a case of typhoid fever, contracts the disease.

I have not hitherto mentioned defective drainage nor polluted soil as sources of typhoid fever. I propose to briefly touch on these because my views are possibly somewhat different from those generally held as regards defective drainage. I think the part played by drain defects outside the walls of a house is very small, unless indeed the water supply is thereby liable to become polluted; as, for example, happens in cesspool districts, which are also supplied by shallow wells. Drainage or structural defects within the walls of a house, as, for example,

[1] As pointed out by Dr. Hamer in 1900. I have suspected other fish in one or two cases, occurring in cooks, who have the cleaning and gutting of fish.

a w.c. supplied with water from a cistern used for drinking purposes without an intervening special cistern, or supplied direct from the main, may, of course, easily lead to dangerous contamination of the water supply. As to soil pollution, I am of opinion that privy-middens are very dangerous structures, *particularly during the fly season*. Generally speaking, any recent specific pollution of the surface of the soil is a source of danger through flies and dust, but when typhoid excreta are carefully buried a few inches beneath the surface, I am inclined to think the danger is reduced to a minimum, provided the capacity of the soil to deal with the excreta is not over-taxed by long continued pollution. As I pointed out in a previous paper,[1] some might argue that the bacteriological evidence is conflicting, but the experiments of Martin and Houston[2] indicate that the typhoid bacillus does not readily live in surface soil, being quickly killed out by ordinary soil bacteria, while those surviving *travel downwards*. Aerial infection from polluted soil can therefore probably only occur from *recent* surface pollution in fairly dry hot weather when evaporation is rapid. But when flies are in season the dangers of recently-polluted surface soil, acting as a source of infection, are obviously greatly enhanced.

The views of two such authorities as Pettenkofer and Sir Shirley Murphy must be mentioned with great respect; the former indicating at Munich a connection between the level of the ground water and typhoid incidence, the latter noting a rise in typhoid fever incidence in London after floods in the Thames Valley. In the light of Houston's investigations already referred to, I hesitate to pledge myself to what I nevertheless opine, that the causal connection of these factors with typhoid-fever incidence is probably practically nil except in low-lying cesspool and shallow well districts. In such districts, however, they may well play a part. In any case whether I am hypercritical or not; whether or not these factors have a distinct connection with an increased incidence of typhoid fever, they undoubtedly come under the heading which I have reserved for final consideration, viz., the part played by polluted water supplies and polluted milk supplies. These are undoubted causal factors of supreme importance. An infected water supply necessarily means, on the one hand,

[1] *Journal of State Med.*, Vol. XI., p. 712.
[2] Supplement to *Thirtieth Ann. Rep. of the Local Govt. Board.*

an epidemic (in the area of supply) of very considerable proportions, or on the other, a high degree of endemicity. It must not be overlooked that epidemics, due to polluted shell-fish, or other fish, or watercress, or ice-creams, etc., are still instances of water-borne infection, though not affecting the public water supplies.

A milk outbreak is characterised by its explosive nature in primarily limited areas corresponding with the areas of distribution of the particular infected milk supplies. Later secondary cases occur through contact with previous cases, etc. The late Dr. J. B. Russell was of opinion[1] that every occurrence of anything like an epidemic of typhoid fever in Glasgow, during the thirty years, 1865 to 1894, had been caused by the distribution of infected milk, and that, in all but one of these epidemics, the infection was acquired from defective water supply, bad drainage, and other defects *at the source of the milk supply in the country*. His observations led him to the notable conclusion *that the status of typhoid fever in Glasgow mainly depended upon rural sanitary administration*.

Until the passing of the Infectious Diseases Prevention Act of 1890, it is extremely likely that a similar conclusion could have been drawn, with justice, from many others of our great towns. Since this adoptive Act was passed, milk epidemics of typhoid fever have not been so much in evidence. Personally, I have been fortunate enough so far not to have had personal experience of a definite milk-epidemic. The Dairies, Cowsheds, and Milkshops Orders, and the Regulations made under Article 13 of the Order of 1885, have, in my opinion, achieved a great work in the prevention of milk epidemics. The late Dr. J. B. Russell's work in this direction, which no doubt largely procured the framing and passing of this important legislative enactment, deserves the perpetual gratitude of the nation. This legislation has, of course, not by any means removed all the possibilities of infection arising through infected milk, but unquestionably it must have greatly reduced the possibilities and risks which would have occurred in its absence.

[1] *Public Health Administration in Glasgow*, edited by A. K. Chalmers, M.D., Glasgow.

"THE IMMEDIATE SUTURE OF RUPTURED PERINÆUM."

A CRITICISM.

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If Dr. Barry's paper on the above subject, published in THE PRACTITIONER,[1] makes a no more lasting impression upon the mind of those who read it, than did the standard and well-tried teaching of the modern works on obstetrics upon the mind of Dr. Barry, then these lines will have been written in vain. But, fearing lest the opinions held by the younger or less experienced members of the profession might be unfavourably influenced by the treatment, or, better, ill-treatment adopted in these cases by the writer of the article referred to, I am tempted to, at any rate, state the other side of the question, and to endeavour to uphold the recognised teaching of the day by setting forth in a few words the reasons for advising the immediate suturing of a lacerated perinæum, and the dangers and disadvantages of other methods.

Originality I admire, provided always that it is reasonable. Dr. Barry states "all text-books of obstetrics and gynæcology recommend immediate suture in cases of ruptured perinæum," and he quotes Herman partly to support this statement; yet the whole drift of his monograph is to recommend an opposite line of treatment, in short, "don't suture." I might go a little further, and point out that not only do the text-books advise *immediate suture* of a tear, but some of the American authors advocate suture *before laceration*, in fact, before the perinæum is distended by the advancing pole of the fœtus, in order the more surely to include in the suture, the levator ani muscle. In these cases, of course, the ligature is not tied until the termination of labour, and should the anticipated injury not occur, the ligature is withdrawn, and if aseptically inserted, it has done no harm other than the prick of the needle felt by the patient during its insertion.

[1] November 1906.

The quotation from Herman is quite true. "Many cases . . . . will heal without suture"; but *how* do they heal? The large majority by cicatrisation of the raw surfaces, and not by primary union of one raw surface to the other. In our gynæcological practices, how often do we see *healed* perinæal lacerations and a gaping vulva with not enough perinæum to support the pessary which we deem necessary to insert, most often to undo the harm done by the non-suture of the perinæum. He recommends a secondary perinæorrhaphy, but the "immediate suture" would be to it as prevention is to cure.

As to the spontaneous healing of a *complete* laceration; to anyone of experience, or who has ever seen the sphincter ani muscle retract, and I use the word advisedly for emphasis, when torn, and its raw ends disappearing into a dimple in the fascia, to form not more than one-third of a circle, and who has experienced the difficulty of approximating satisfactorily the cut ends, even after stretching and temporarily paralysing the muscle, the question would arise, has the writer ever seen a *complete* laceration?

It is quite true that all stitched perinæums do not heal successfully. The causes will be as follow:—Jagged edges sloughing—this can be prevented by trimming off with a sharp scissors at the time of suture all such portions; inclusion of bacteria between the raw surfaces causing suppuration—the remedy is obvious; unsuitable or unsterile sutures—use silkworm gut or chromic catgut made sterile; silk will act as a wick, and infection may travel along its tract, but even this does not always prevent union of the raw surfaces, although it will cause suppuration along the stitch puncture; too tight or too loose tying of the ligature—if the former, it will cut off the blood-supply to the part, if the latter, imperfect apposition results, and the lochia, reeking with micro-organisms after the first day or two, will stream over the raw surfaces, and favour the formation of a so-called "puerperal ulcer" with its train of symptoms too well known, and its risks of being the starting place of septic endometritis or worse. Dr. Barry states: "Strict instructions must be given not to have the bandage (which fastens the knees of the patient together) disturbed for four days," or non-union may

result; and that "sponging . . . may be done (of the vulva) two or three times daily," and that, if micturition is impossible by other means, a catheter may be passed night and morning. I cannot reconcile these statements, I should be glad to know the method of sponging and catheterisation without removing the knee-bandage and without separating the knees, the very thing which may "frustrate the object."

Occasionally we blame stitches for causing retention of urine and rendering the use of the catheter—a proceeding not unattended by risks especially after the third day—necessary; but Dr. Barry hints that it may be necessary also with his method.

If the perinæum is sutured, the posture assumed for catheterisation will not affect the suturing, but if unsutured, separation of the delicate granulation tissue, if any exists, must inevitably result.

Immediate suture of the torn *cervix* has been strongly advocated by some of the best authorities as a means of avoiding not only "traumatic hæmorrhage" but *actual sepsis*; much more so is immediate suture of the perinæum, for this avenue of entrance to bacteria is more likely to become contaminated than the cervix.

With regard to the pain of the operation of "immediate suture," the mention of which is stated to be "a source of terror" to the Cork women, if it is done immediately as the name implies, the same force and stretching which caused the laceration, has rendered the parts, temporarily, partially anæsthetic, and the large majority of patients complain but little, if at all, of the needle prick.

In any case, if the patient has taken chloroform, another little whiff may be given without danger or trouble to prevent this sensation. Dr. Fitzgerald in his criticism of Dr. Bishop's paper on "Postpartum Hæmorrhage" (THE PRACTITIONER of November and October respectively) suggests—and very rightly so—that the attendant should "study the pictures on the wall" and *wait* rather than hurry the third stage of labour. I should profitably occupy a portion of this time by suturing—if required—the perinæum, knotting together the long ends of the ligatures, and not drawing them tight until the third stage is completed. There is no offence or disgrace in allowing a

perinæum to be torn, sometimes it is unavoidable, and sometimes it takes place before the doctor's arrival; but there is many a perinæum that might have been saved had the advancing head been better controlled, and, in a vertex case, great flexion promoted in order to substitute for the occipito-frontal diameter of the fœtal head, the lesser sub-occipito-bregmatic. But, in any event, sneers or hard words *then* would seem as praise if compared with the remarks likely to be passed by the gynæcologist, into whose hands I fear many patients would be likely to fall, if their accoucheur followed Dr. Barry's line of treatment.

Prize Essay.

THE DIAGNOSIS AND TREATMENT OF RENAL COLIC.

By HAROLD UPCOTT, F.R.C.S.,
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INTRODUCTION.

Pain, of the nature of colic referred to the abdomen, is a fairly frequent symptom of disease of several of the viscera in this region, and renal, or more correctly, ureteral colic is a subjective symptom of more than one disease of the kidney.

It is necessary to insist upon the fact that ureteral colic is only a symptom, and, bearing this in mind, its mere diagnosis affords indication only for symptomatic treatment, and such treatment will vary but little from that suitable to other forms of colic.

When once the diagnosis of renal colic has been established, the surgeon possesses a clue, directing his attention to the upper urinary tract, and, it is only after an investigation into the structural and functional disabilities of the kidneys and ureters, that he is in a position to treat the condition rationally. Proceeding along these lines, it is necessary first to describe the character and seat of the pain, secondly to mention somewhat similar symptoms due to affections of other viscera, and to discuss the points which will lead to a differential diagnosis. Having thus reached a conclusion as to the nature of the pain, it becomes advisable to study, in greater detail, its exact origin, and to consider the lesions of which it may be the expression.

THE PAIN OF RENAL COLIC.

In a typical case, the pain is of sudden onset, it grips the patient in the loin, and rapidly reaching its greatest severity, shoots down the side to the inguinal region, or radiates down the back of the thigh. One agonising paroxysm succeeds another, the wretched sufferer is unable to control himself,

and writhes groaning upon the bed, his face streaming with perspiration. Usually he vomits, and frequently has an intense desire to pass water. The agony usually ceases abruptly, leaving the patient sore and exhausted. On subsequent inquiry, the description of the attack will be found to vary in different patients, according to their descriptive ability, but they generally agree in stating that the pain was unendurable.

A seizure, such as that above described, is fairly characteristic, but, as an attack of renal colic may differ widely from the classical type, it will be convenient to consider it under the following headings :—

1. *Onset of the Pain.*—This is usually sudden, and frequently appears to bear a definite relation to some quick or unexpected movement, a sudden jar or stumble, or the strain of lifting some heavy object.

2. *Intensity of the Pain.*—The sudden severity of the pain is usually stifling, the patient feeling as though his loin were gripped in a vice, and the downward radiations of the pain being likened to the boring of a hot iron. Such pain will cause the strongest man to tremble. At other times, the pain, though sharp and severe, may be perfectly bearable, and, in some persons subject to renal colic, yet slighter attacks may be recognised as such, which, in another individual, would scarcely warrant the name of renal colic.

3. *Seat of the Pain.*—This is commonly referred to one or other side of the back beneath the lower ribs, thence it extends downwards, passing to the front, along the groin, and into the testis. The pain may pass down the inner side, or back of the thigh, along the course of the great sciatic nerve to the leg, or even to the heel.

It is not, however, an invariable rule for the pain to commence in the back, it may be felt only along the course of the lower part of the ureter, in the testis alone, or it may manifest itself merely as paroxysmal sciatica.

4. *The Duration of the Pain.*—This is variable, from a few hours to several days, and its cessation is abrupt. Indeed the sudden relief, experienced at the close of an attack, is sometimes very striking. At other times, the colic may gradually subside, the pain becoming localised either in the kidney, or at some point along the course of the ureter.

CONCOMITANT SYMPTOMS AND OBJECTIVE SIGNS.

As already stated, vomiting is frequent, and, even when the patient does not actually retch, there is a sense of great nausea, and the abdomen is often distended. Sweating is the rule, drops of perspiration breaking out upon the pale clammy skin. There is usually an intense desire to micturate, but, if the bladder has been recently emptied, a few drops only of urine are voided. The pulse increases in rapidity during the attack, but the temperature is, as a rule, not elevated. If the patient is a boy, or young adult, the testis of the side, on which the pain is felt, is often seen to be drawn up by contraction of the cremaster ; this is not so noticeable in men over 20. On palpation of the abdomen after the attack, a marked tenderness of the ureter is often found, and an examination of the urine subsequently passed, may reveal the presence of blood casts, or pus, or again a large quantity of clear urine of low specific gravity may be voided, these variations depending to a certain extent on the nature of the affection responsible for the symptom of renal colic.

DIFFERENTIAL DIAGNOSIS.

The pain due to gall-stones, or other obstructions of the biliary passages, may closely simulate that due to disease of the right kidney or ureter. The pain, due to one of the former conditions, is, however, of a somewhat different character, and usually commences in the epigastrium, and feels like an irresistibly tightening grip ; it then bores through to the back, to the right scapula, and spreads down along the right costal margin, thence passing towards the umbilicus. The edge of the liver is frequently tender on palpation, and an area of hyperæsthesia may be determined on the right side of the spinous process of the tenth dorsal vertebra. There is also frequently a slight rigidity of the right rectus muscle. If the colic is due to obstruction of the cystic duct, a tumour may be felt which, on further examination, may be differentiated from a palpable kidney. At times the tumour may project visibly, further examination is then unnecessary. Where obstruction of the common or hepatic ducts is the origin of the colic, a sharp rise of temperature, or a rigor, and the subsequent jaundice will indicate the seat of the trouble. The previous

history will sometimes throw a light on the case, for although, both in cholelithiasis and in nephrolithiasis, a history of preceding "indigestion" is obtainable, yet, in the former condition, a closer inquiry will show that the symptoms were more related to gastric or duodenal ulceration, while, in the latter condition, it is not unusual to find symptoms pointing rather to the colon.

The various forms of intestinal colic require consideration, thus the colicky pains, abdominal distension, vomiting, collapse, and diminished excretion of urine, associated with acute obstruction of the intestine high up, will be distinguished from renal colic by the character of the vomit, by the less intensity of the pain and the absence of its typical radiation, and by the rapidly-increasing gravity of the patient's condition. The pain, met with in chronic lead poisoning, also lacks the typical distribution of renal colic, while the occurrence of paralysis and tremors, the anæmia, and the blue line on the gums, taken together with the history, will lead one to a correct diagnosis.

The griping pains in mucous colitis may cause some confusion in the diagnosis, more especially since colic, in this portion of the intestine, is not uncommonly associated with kidney trouble. If the colic is due to conditions occurring in the colon, the diagnosis will be reached by attention to the dejecta, and by direct examination of the bowel. If the patient is a woman of nervous temperament, who, in addition to the paroxysms of pain, is anæmic and depressed, and has painful evacuations of mucinoid material per rectum, the question of mucous colitis of nervous origin must be considered.

The pain in appendicitis may be mistaken for right ureteral colic, it may be severe and cutting, and may radiate towards the testis. If the tip of the appendix is adherent to the bladder, the vesical symptoms will tend still further to obscure the diagnosis. Any marked alteration in the sequence of the onset of symptoms of appendicitis—pain, nausea and vomiting, abdominal sensitiveness and fever—should lead one to suspect the possibility of some other cause for the symptoms; although this sequence is rarely transgressed, yet, in cases of appendiceal colic, due to stricture or kinking, there may be no rise of temperature.

The local tenderness on deep pressure, associated with appendix trouble, may be mimicked by the impaction of a ureteral calculus at the pelvic brim.

The principal points, in the differential diagnosis of these two conditions, are:—

1. *Character of the Pain.*—Severe as the pain may be in commencing appendicitis, it never reaches the same intensity that ureteral colic may attain, and this is true of all forms of intestinal colic. Moreover, the seat of most acute pain, in kidney affections, is generally situated at a higher level than that of appendicitis, excepting the cases of undescended cæcum. If the colic is due to ureteral calculus, or ureteritis, it will be situated lower down, but, in such cases, vesical tenesmus is usually well marked.

2. *Temperature.*—Fever is commonly absent in renal colic, but rarely there is a marked rise of temperature. In inflammatory disease of the appendix, the temperature will invariably rise, though the elevation may be transitory, and need frequent observation for its detection.

3. Abdominal palpation may discover a fixed swelling, or deep resistance in the iliac fossa, this will indicate appendicitis. On the other hand, abdominal rigidity and local tenderness may be met with in both conditions.

4. *Blood.*—If an examination of the blood shows an increase in the proportional number of polymorphonuclear neutrophils, the colic is unlikely to be of renal origin.

5. *Urine.*—Hæmaturia is frequent after renal colic. If clots, in the shape of ureteral casts, are found, the colic may certainly be ascribed to the kidney.

Gastric, or more usually duodenal, ulcer may give rise to attacks of abdominal colic; here the relation of pain to the ingestion of solid food is the most important diagnostic factor, while the presence of the localised areas of tenderness, and an examination of the stomach contents will throw further light on the case. The gastric symptoms in Dietl's crises may direct suspicion to the stomach, but, in such cases, the movable, or distended, kidney can usually be felt.

Speaking generally, it may be said that the colic of duodenal ulceration is less severe than renal colic, but it should be borne in mind that the former condition is frequently associated

with cholelithiasis, the symptoms of duodenal ulcer may thus be complicated with right-sided colic of great severity.

Other more rare examples of intestinal colic may be met with in cases of angio-neurotic œdema, and in certain forms of purpura, but the principal lesions are so evident and striking that they are not likely ever to cause confusion.

Spasmodic dysmenorrhœa need only be mentioned, for, although the pain is severe and paroxysmal, and may even cause prostration and vomiting, yet its seat, in the pelvis and back, with its obvious relationship to the menstrual flow, suffices to distinguish it from renal colic.

The absence of the knee-jerks, and pupillary reflex to light, together with the other nervous symptoms of tabes, will enable one to arrive at a correct diagnosis in cases of nephric crises.

In cases of testicular neuralgia, in which the pain is great, and no sufficient local condition can be found to account for it, the kidney and its secretion should be examined, for a typical renal colic may be manifest solely in this situation.

Finally, there may be mentioned, among other diverse conditions simulating renal colic, spinal caries, and the "cœliac neuralgia" of Friedreich. A case of the former condition is recorded by Wright, in which the pressure of a tuberculous abscess gave rise to pain of the nature of renal colic; while the "cœliac neuralgia" of Friedreich, associated with pancreatic cysts, depends for its recognition on the diagnosis of the origin of the fluid swelling.

We have now considered the material upon which the diagnosis will be based.

It should be remembered that, if a patient is first seen while suffering from an attack of renal colic, it is unlikely that a minute examination will be feasible if desirable, and the sufferer will not be in a condition to give a clear account of previous symptoms; it is enough to recognise the urgent need for relief of pain. Unless there is marked evidence pointing to other conditions, the thought of renal colic will probably be uppermost in one's mind, though indeed this matters little so far as the symptomatic treatment is concerned.

If the pain is great, and the diagnosis fairly clear, a hypodermic injection of morphia ($\frac{1}{4}$ gr.) should be given, while hot fomentations to the abdomen may serve to ease the pain

until the morphia takes effect. If the pain is less severe, or accompanied by a marked rise of temperature, indicating kidney infection, an attempt may be made to moderate the pain without having recourse to morphine injections. Hot fomentations, or turpentine stupes, are applied over the seat of the pain; this treatment will probably have been already instituted, meanwhile a hot bath is being prepared into which the patient is placed. The temperature of the bath is then gradually raised by adding hot water, and the patient remains in it from one-half to three-quarters of an hour, or until he begins to feel faint; he is then wrapped in a hot blanket and returned to bed. If there is much strangury, the patient should be encouraged to pass water before leaving the bath. Drugs by the mouth and hot drinks may be given, but, in all probability, they will be vomited. It will be seen that the general object of treatment is the relaxation of muscular spasm, and the attainment of this is most likely to give relief when the colic is due to the passage of a calculus along the ureter. Sometimes wet or dry cupping the loins will ease the pain, but, as will be pointed out later, this will only apply to those cases in which the colic is due to increased vascular tension within the kidneys.

Finally, the colonic distension and tympanites, associated with the colic, may call for high irrigation of the bowel with hot water or saline.

CAUSE OF RENAL COLIC.

In its most typical form, the pain is probably due to excessive peristaltic waves of contraction passing down the ureter, excited by the contact of some foreign body with its walls, or with the infundibulum of the renal pelvis. Apart from his, however, the pain may occur in cases, in which there is no reason to suspect undue contractions of the ureteral wall, and in which the mischief is apparently confined to the kidney; such are the cases of colic with granular kidney, described by Mansell Moullin, Israel, Morison, and Ransohoff; or those cases of increased vascular tension in the kidney alone, due to mechanical or reflex causes, quoted by Newman. Again, renal colic may be a symptom of cystic disease, or of hypernephroma, even when there is no hæmaturia.

In coming to a conclusion as to the particular affection responsible for renal colic, careful and repeated examinations of the urine are of the utmost importance, and any alterations from the normal in the urine, passed during, or immediately after, an attack, possess special significance.

Before proceeding to a discussion of such alterations, it will be convenient to mention certain changes in the quantity of urine passed at the time of the seizure. Renal colic may be associated with total suppression; this is most likely to be due to the lodgment of a calculus in the ureter, obstructing the flow from the only functioning kidney, or a unilateral ureteral obstruction may give rise to a reflex arteriole spasm in the opposite kidney, whose excretory capabilities are perhaps already somewhat impaired. Although renal colic, with anuria, is strongly suggestive of nephrolithiasis, yet there are certain cases of great interest on record in which an acute intestinal obstruction gave rise—it is supposed reflexly—to spasm of the renal arterioles, associated with renal colic and suppression of urine, indeed the kidney symptoms were so prominent that it was not until the excretion of urine had been restored, by cupping the loins, that the obstruction was diagnosed.

Sometimes, after a period of diminished excretion, an attack of colic may be terminated by a copious discharge of urine of low specific gravity. This sequence of events would direct one's attention to the probability of intermittent uronephrosis, while keeping in mind the possibility of transient hyperæmia of a movable kidney, which may give rise to similar symptoms. There may also be a free secretion of urine after the passage of a calculus, but, in both these latter conditions, the urine will probably contain blood.

The co-existence of bloody urine with renal colic is a diagnostic factor of some importance. The blood may come from the renal pelvis, from the substance of a growth, or from the convoluted tubules; it may be intimately mixed with the urine, or passed in the form of clots.

Malignant, or papillomatous growths of the renal pelvis, or of the substance of the kidney, which have invaded the calyces, are liable to cause profuse hæmorrhage. The growth of these tumours is usually painless, save for the colic due to the passage of clots, or fragments of growths, down the ureter.

Clots, recognisable as casts of the ureter or pelvis, may be found, after an attack of colic, in cases of traumatic laceration, or bruising of the kidney, and also in cases of suppurative pyelonephritis. If the origin of the hæmorrhage is in the convoluted tubules, a microscopical examination of the urine will reveal the presence of tubular blood casts; these should always be looked for, and may prove of great service in the diagnosis. Thus, a patient may be seized with severe renal colic following a jolt or strain. During the attack, the urine is diminished in amount, but subsequently a large quantity of "smoky" urine is passed. The condition may be due to displacement of a renal stone, which, becoming temporarily impacted in the upper end of the ureter, has led to a distension of the pelvis with urine, or it may be due to the dropping forwards of the upper pole of a slightly movable kidney, which has resulted in strangulation of the renal vessels by the ureter, and a hyperæmia of the organ. If, however, blood casts are found in urine, the cause of the renal colic is probably the latter condition.

Renal colic, which is not accompanied by hæmaturia, may also be a symptom of calculous disease, either because the stone is so small and rounded that its presence has not led to ulceration or excoriation of the mucosa, or because the stone may so securely occlude the ureter that no urine can escape past it. As a rule, however, the colic of nephrolithiasis is associated with hæmaturia.

Blood is usually, though by no means invariably, absent when the colic is a symptom of transient uronephrosis. In these cases, the passage of a large quantity of light-coloured urine is not merely an incident following an attack of renal colic, but appears to be directly connected with the relief of pain; and, previous to the relief, a gradually enlarging cystic abdominal swelling will be palpable.

A movable kidney, whose pedicle has become kinked or twisted, has already been mentioned as a possible cause of colic and hæmaturia, but it is to be noted that the resulting increased vascular tension, within a movable kidney, may give rise to colic alone, this variability depending, possibly, upon the degree of vascular engorgement.

A hypernephroma, occurring in the kidney, is usually

associated with hæmorrhage, and frequently with paroxysmal attacks of colic, though Albarran and Imbert state that pain, without hæmaturia, is not uncommon. Such cases are also recorded by Bierring and by Lubarsch.

Renal colic may occur in connection with cystic disease of the kidney, and an examination of the urine may reveal the presence of blood. This hæmaturia, however, is not necessarily associated with the colic, and is indeed, more often than not, absent altogether. Further investigation of the urine will probably lead to the discovery of granular casts, a low percentage of urea, and perhaps a trace of albumen. These findings, together with the presence of a bilateral nodular tumour, whose characteristics are those of a kidney swelling, are very suggestive of cystic disease, and should lead to a careful inquiry into the family history.

The passage of daughter cysts down the ureter, from a ruptured echinococcus cyst of the kidney, gives rise to severe renal colic. If such an attack of pain follows the rapid diminution in size of a cystic abdominal swelling, and the microscopical examination of the urine discloses the presence of scolices or hooklets, the diagnosis is clear.

A full discussion of the methods of treatment, necessitated by these varied causes of renal colic, is here impossible, but certain of these conditions may constitute a serious and imminent danger to life, and something beyond symptomatic treatment is urgently needed. It will be sufficient to notice the essential points of such treatment, and then to mention briefly the indications in the remaining conditions.

If a patient has suffered an injury, calculated to rupture or lacerate the kidney, and if, in addition to renal colic and hæmaturia, the primary shock undergoes no abatement, while the symptoms of loss of blood rapidly become more evident, possibly coinciding with an increase of dulness in the flank, then exposure of the kidney is necessary. The organ should be examined by the lumbar route, though, where there is great peritoneal extravasation, an anterior abdominal incision is to be preferred. The further treatment may be nephrectomy, if the kidney is hopelessly crushed, or if the larger renal vessels are torn ; if the lacerations, though extensive, are not sufficient to permanently destroy the function of the kidney, an attempt

should be made to control the bleeding with deep mattress sutures of catgut, failing this, gauze plugging must be resorted to, while partial nephrectomy may at times be called for. Should it be found that the bleeding is wholly intrarenal, a nephrotomy, followed by gauze tamponing, will probably be the wisest course. Penetrating wounds of the kidney may cause renal colic. The treatment will be abdominal section, unless there is good reason for believing the peritoneal cavity to be uninjured. The kidney lesion will be dealt with on the same lines as for subcutaneous laceration.

The treatment of renal colic, associated with suppression of urine, will be directed, first, to the endeavour to overcome what is possibly a reflex cessation of function, and if this fails, to proceed to operative measures.

The first indication demands a hot bath or hot pack, and cupping of the loins; the operative treatment will be nephrotomy, and possibly drainage of the kidney, which is deemed to be the more healthy, or recently affected of the two.

Among the other kidney affections, already enumerated, the severity of the colic, or its continuance, may require operative measures for its relief, quite apart from the surgical indications of the disease, of which it happens to be a symptom. For example, the removal of a stone from the pelvis of the kidney, the fixation of a movable kidney, or the relief of ureteral kinking, or faulty implantation, which has led to a distended pelvis, the evacuation of an hydatid cyst, or even the decortication of a contracted granular kidney—any one of these may be called for solely on account of the pain.

At the same time, it must be borne in mind that most of these conditions need similar treatment whether colic is a prominent factor in the case or no.

An account of the treatment of renal growths, tuberculosis, cystic, or suppurative diseases, in whose course the colic is but an incident symptom, would lead too far beyond the limits imposed by the title of this paper. Such diseases are, nevertheless, deserving of brief mention, for treatment, directed to any one of their symptoms alone, is, after all, but a temporary expedient.

SOME FAMOUS QUACKS.

III.

THE CHEVALIER TAYLOR.

ONE of the celebrated quacks of the eighteenth century, and indeed of all time, was John Taylor, "oculist," whose career is, as Dr. Johnson said, a most striking instance how far impudence can carry ignorance. The title page of a biography written by his son is at once an abstract and brief chronicle of his life, a monument of human folly, and a model of what may be called the high art of quack advertisement:

"The Life and Extraordinary History of the Chevalier John Taylor. Member of the most celebrated Academies, Universities and Societies of the Learned. Chevalier in several of the first courts in the world. Illustrious (by patent) in the apartments of many of the greatest princes. Ophthalmiater Pontifical, Imperial and Royal to His late Majesty—to the Person of Her Imperial Majesty—to the Kings of Poland, Denmark, Sweden, etc.—to the several Electors of the Holy Empire—to the Royal Infant Duke of Parma—to the Prince of Saxe-Gotha, serenissime Brother to Her Royal Highness the Princess Dowager of Wales—to the Prince Royal of Poland—to the Late Prince of Orange—to the present Princes of Bavaria, Modena, Lorrain, Brunswick, Anspach, Bareith, Liège, Salzbourg, Middleboug, Hesse-Cassel, Holstein, Zerbst, Georgia, &c. Citizen of Rome, by a Public Act in the name of the Senate and the People—Fellow of that College of Physicians—Professor in Opticks—Doctor in Medicine and Doctor in Chirurgery in several Universities abroad. Who has been on his travels upwards of thirty years, with little or no interruption, during which time he has not only been several Times in every Town in these Kingdoms, but in every Kingdom, Province, State, and City of the least consideration—in every court—presented to every crowned head and Sovereign Prince in all Europe, without exception. Containing the greatest variety of the most entertaining and interesting adventures

that, 'tis presumed, has ever yet been published in any country—or in any language."

It is only right to state that this "Life" was a scurrilous production, presenting Taylor as a profligate and his cures as frauds, carried out in collusion with his patients. The son made no serious attempt to repudiate the authorship, but Taylor's grandson declared it to be the work of a certain Henry Jones, who, after being entrusted with the materials, betrayed his trust.

John Taylor was not a quack in the technical sense, for he received what, for his day, was a regular medical education. He was the eldest son of a surgeon and apothecary of Norwich, and was born on August 16, 1703. In 1722 he became assistant to an apothecary in London, and studied surgery at St. Thomas's Hospital, under William Cheselden, devoting special attention to diseases of the eye. After a time he returned to Norwich, where he set up in practice as a general surgeon. Meeting with considerable opposition, he sought fortune as an itinerant oculist. Between 1727 and 1734 he travelled over the British Isles and a large part of Europe. It is admitted that he had considerable skill as an operator, and he invented a cataract needle and other instruments. In 1733 he obtained the degree of M.D. at Basle, and was also made a Fellow of the College of Physicians of that city. In 1734 he received the Doctor's degree from the Universities of Liège and Cologne. In the same year he toured through France and Holland, returning to London towards the end of 1735. Wherever he went he lectured and treated such patients as his boasting and unlimited promises of cure brought into his net. A specimen of his lectures has been preserved. He addressed the University of Oxford in the following grandiloquent strain:—

"The eye, most illustrious sons of the muses, most learned Oxonians, whose fame I have heard celebrated in all parts of the globe—the eye, that most amazing, that stupendous, that comprehending, that incomprehensible, that miraculous organ, the eye, is the Proteus of the passions, the herald of the mind, the interpreter of the heart, and the window of the soul. The eye has dominion over all things. The world was made for the eye and the eye for the world. My

subject is light, most illustrious sons of literature—most intellectual light. Ah ! my philosophical, metaphysical, my classical, mathematical, mechanical, my theological, my critical audience, my subject is the eye. You are the eye of England ! England has two eyes—Oxford and Cambridge. They are the two eyes of England, and two intellectual eyes. You are the right eye of England [Cambridge was the right eye when he lectured there], the elder sister in science, and the first fountain of learning in all Europe. What filial joy must exult in my bosom, in my vast circuit, as copious as that of the sun himself, to shine in my course, upon this my native soil, and give light even at Oxford ! . . . The eye is the husband of the soul ! The eye is indefatigable. The eye is an angelic faculty. The eye in this respect is a female. The eye is never tired of seeing ; that is, of taking in, assimilating, and enjoying all nature's vigour."

In 1736 he was appointed oculist to George II. ; and for more than 30 years he continued his itinerant method of practice, making London his headquarters, but visiting in turn nearly every court and country in Europe.

Taylor's wide practice brought him into contact with many notabilities. Horace Walpole mentions him twice in his letters. In writing to Sir Horace Mann on January 9, 1755, he says : " I need not desire you not to believe the stories of such a mountebank as Taylor ; I only wonder that he should think the names of our family a recommendation at Rome ; we are not conscious of any such merit ; nor have any of our eyes ever wanted to be put out." Again, in a letter to Lady Hervey, written on October 17, 1758, he says :—" After all these important histories I would try to make you smile, if I was not afraid you would resent a little freedom taken with a great name. May I venture ?

> Why Taylor the quack calls himself Chevalier,
> 'Tis not easy a reason to render;
> Unless blinding eyes, that he thinks to make clear,
> Demonstrates he's but a *pretender*.

In Boswell's *Life of Johnson*, Taylor is mentioned by the Doctor. " Talking of celebrated and successful irregular practisers in physick, he said : ' Taylor was the most ignorant man I ever knew, but sprightly . . . Taylor challenged me

once to talk Latin with him; (laughing) I quoted some of Horace, which he took to be a part of my own speech. He said a few words well enough.'" Dr. King, in his *Anecdotes of his Own Times*, takes Taylor's pretensions more seriously. He says: "I was at Tunbridge with Chevalier Taylor, the oculist. He seems to understand the anatomy of the eye perfectly well; he has a fine hand and good instruments, and performs all his operations with great dexterity; but he undertakes everything (even impossible cases) and promises everything. No charlatan ever appeared with fitter and more excellent talents, or to greater advantage; he has a good person, is a natural orator, and has a faculty of learning foreign languages. He has travelled over all Europe, and has always with him an equipage suitable to a man of the first quality and has been introduced to most of the sovereign princes from whom he has received many marks of their liberality and esteem."

The same scholar wrote a Latin inscription on the Chevalier in which one may detect a flavouring of satire:

> "Hic est, hic vir est,
> Quem docti, indoctique omnes impense mirantur,
> Johannes Taylor;
> Cœcigenorum, cœcorum, cœcitantium,
> Quotquot sunt ubique,
> Spes unica—Solamen—Salus."

We get a glimpse of Taylor lecturing in Nichols's *Literary Anecdotes*. At Northampton, he says, "the doctor appeared dressed in black, with a long light flowing ty'd wig; ascended a scaffold behind a large table raised about two feet from the ground, and covered with an old piece of tapestry, on which was laid a dark-coloured cafoy chariot-seat with four black bunches (used upon hearses) tyed to the corners for tassels, four large candles on each side of the cushions, and a quart decanter of drinking water, with a half pint glass to moisten his mouth." "In his orations," says Jeaffreson, "when he aimed at sublimity, he indulged in short sentences each of which commenced with a genitive case followed by an accusative; after which came the verb succeeded by the nominative. Thus, at such crises of grandiloquence, instead of saying 'I will lecture on the wonders of the eye,' he would invert the order to, 'Of the eye on the wonders lecture will I!' By doing this, he maintained that he surpassed the

finest periods of Tully!" He called it "the true Ciceronian, prodigiously difficult, and never attempted in our language before."

Amongst other illustrious patients upon whom Taylor tried his skill were Gibbon, the historian, and Handel. Of the latter he says: "At Leipzig, a celebrated master of music who had already arrived to his 88th year, received his sight by my hands; it was with this very man that the famous Handel was first educated, and with whom I once thought to have the same success, having all circumstances in his favour, motions of the pupil, light, etc.; but, upon drawing the curtain, we found the bottom defective from a paralytic disorder."

Taylor boasted that he was the author of 45 works in different languages. His chief productions are:—

1. An impartial Inquiry into the seat of the Immediate Organ of Sight. Dedicated to Dr. Buxton, and published in London, 1743.

2. Traité sur les maladies de l'Organe immédiat de la vue. Addressé à Messieurs de l'Académie Royale des Sciences à Paris par Jean Taylor, Docteur en Médecine, Chirurgien et Oculiste et Membre de la Faculté de Médecine de l'Université de Basle en Suisse. Published at Paris, 1735.

3. A new treatise on the Diseases of the Chrystalline Humour of the Human Eye: or of the Cataract and Glaucoma, with a New Theory of their Causes, and an Endeavour to demonstrate that there are no membranous cataracts; but that all cataracts are from an alteration of the Chrystalline Humour itself. With an exact description of a new and more successful method of making the operation necessary to the Removal of the Several Species of the diseases. Humbly addressed to Her Majesty. To which is prefixed a letter to the Physicians and Surgeons of London and Westminster. By John Taylor, M.D., Oculist, Fellow of the College of Physicians in Basle in Switzerland, and of the Imperial Academy of Colohn in Germany, and of the Society of Liège and Rheims.

4. An account of the Mechanism of the Eye. Published at Norwich, 1727.

5. The case of Sir Jeremy Sambrooke, Baronet. Fairly and Impartially stated containing a full and exact account of

the Singular Disorder of the Eye of this Gentleman. With a faithful relation of the Great Variety of uncommon circumstances attending his cure, and a clear demonstration of the Highest Probability of his perfect Recovery. Humbly inscribed to himself by J. Taylor, Doctor of Physick; Oculist to His Majesty and Member of Several of the Colleges of Physicians in other parts. Qui dat Videre, dat Vivere.

6. Le Mechanisme ou le Nouveau traité de l'Anatomie du Globe de l'œil. Published in 1738.

Besides these works he published an autobiography written in the most inflated style and dedicated to his son. Taylor knew the value of the puff preliminary as well as some writers of our own day. Before publishing the story of his life, he endeavoured to inflame public curiosity by a preliminary announcement in the *Gentleman's Magazine*, 1761. The following is an extract:—

"I am perfectly acquainted with the history of Persia, as well before as since the death of Thamas Kouli Khan; well informed of the adventures of Prince Heraclius; was personally Known to a Minister he sent to Moscow in a first attempt to conquer that country, and am instructed in the cruel manner of putting out the eyes of conquered princes, and of cutting away the eyelids of soldiers taken in war, to make them unfit for service.

"I have lived in many convents of friars of different orders; been present at their creation to various degrees, and have assisted at numberless entertainments upon those occasions.

"I have been in almost every female nunnery in all Europe (on account of my profession), and could write many volumes on the adventures of these religious beauties.

"I have been present at the making of nuns of almost every order, and assisted at the religious feasts given on those occasions.

"I have met with a very great variety of singular religious people called pilgrims.

"I have been present at many extraordinary diversions designed for the amusement of the sovereign, viz., hunting

of different sorts of wild beasts, as in Poland; bull-fighting, as in Spain.

"I am well acquainted with all the various punishments for different crimes, as practised in every nation—been present at the putting of criminals to death by various ways, viz., striking off heads, breaking on the wheel, etc.

"I am also well instructed in the different ways of giving the torture to extract confession, and am no stranger to other singular punishments, such as impaling, burying alive with head above ground, etc.

"And lastly, I have assisted, have seen the manner of embalming dead bodies of great personages, and am well instructed in the manner practised in some nations for preserving them entire for ages, with little alteration of figure from what they were when first deprived of life.

"All must agree that no man ever had a greater variety of matter worthy to be conveyed to posterity. I shall, therefore, give my best care to so to paint my thoughts, and give such a dress of the story of my life, that though I shall talk of the great, the least shall not find cause of offence."

The following passage may be taken to show that he was a precursor of some quacks of the present day: "I have known marvellous effects from the power of faith, in the cure of various diseases of the body, and above all, a vast variety of extraordinary instances in the imagination of women."

The autobiography appeared in 1761 under the title of *The History of the Travels and Adventures of the Chevalier John Taylor*. The title-page states that the book "contains all most worthy the attention of a Traveller—also a dissertation on the Art of Pleasing, with the most interesting observations on the Force of Prejudice; numberless adventures, as well amongst nuns and friars as with persons in high life; with a description of a great variety of the most admirable relations, which though told in his well-known peculiar manner, each one is strictly true, and within the Chevalier's own observations and knowledge."

Like many better men, Taylor wrote too much for his fame.

In some lines addressed to another famous quack, Mrs. Mapp, the bonesetter of Epsom, there is an allusion to him:

> Next travell'd Taylor fill'd us with surprise,
> Who pours new light upon the blindest eyes;
> Each journal tells his circuit through the land;
> Each journal tells the blessings of his hand:
> And lest some hireling scribbler of the town
> Injures his history, he writes his own.
> We read the long accounts with wonder o'er.
> Had he wrote less, we had believed him more.

In 1767 Taylor went abroad, never to return. He visited Paris, and went on to Prague, where he died in a convent in 1772. By a curious nemesis he lost his sight towards the end of his life. A portrait of him engraved from a picture painted at Rome by the Chevalier Ryche, is prefixed to his "Nouveau Traité de l'Anatomie du Globe de l'œuil." He was engraved from life by Philip Endlich in 1735; and he appears in Hogarth's "Consultation of Physicians," where he is depicted leering at Mrs. Mapp.

In spite of satires and abuse, however, Taylor for a long time flourished exceedingly; perhaps they served as advertisements for him. No man better knew the whole art of advertisement. Had he lived a century later, he would have made an excellent American man of business.

In fairness it should be remembered that an ophthalmologist of such genuine skill as Jacques Daviel, of Marseilles, who was his contemporary, was also an itinerant practitioner, and used to have his advent in a town heralded by announcements in the local newspapers almost as boastful as those of Taylor.

The Chevalier's son, John, who followed in the paternal footsteps, had a flourishing and lucrative business in Hatton Garden. On the death of his father, however, he failed to secure the succession to his post of oculist to George II. His son, John Taylor the Third, was oculist to George III. and George IV.

NOTES FROM FOREIGN JOURNALS.

PASSIVE MOVEMENTS IN HEMIPLEGIA.

Faure draws attention to the good results which can be obtained by the systematic use of passive movements in paralysed limbs. The usual fate of a hemiplegic patient, after he has recovered from the immediate effects of the stroke, is to be left alone with his powerless limbs, which, as time goes on, wither and get fixed in awkward positions by contractions. The upper limb suffers the more, for as soon as the patient can sit up in bed he begins to use the lower limb to some extent, and does much more with it, when he is able to leave his bed and begins to walk again. This condition of paralysis, more or less complete, with atrophy and contractions, has come to be regarded as inevitable, but the difference between the upper and lower limbs, one of which is not made to work, while the other is forced to do a certain amount, suggests that a better result was possible. Faure has put the idea into practice, suiting his technique to each case, and has carried it out on different sorts of hemiplegic cases, not only on those, in whom the first seizure was recent, but also on those of long-standing. He has never observed that passive movements, carried out prudently and methodically, even when begun within a few hours after the apoplexy occurred, have given rise to the least trouble. As a result of some years' experience, he is convinced that considerable benefit can be obtained.

In the first place, the arthritis, which so soon attacks the shoulder-joint, is diminished, together with the accompanying pain and the affection of the other joints of the limb. Passive movement is preserved in those articulations, in which it has a tendency to disappear, and in which it certainly does disappear if left untreated. Contractions and immovable joints, which are so frequent in the hand, are prevented. The atrophy and atony of the muscles can be favourably influenced by the help of massage and localised faradaic currents, while the action of a continuous current will certainly lessen the pains.

In short, and to this point the author wishes to draw the attention of neurologists, one never sees in patients treated in this way the general and progressive contractions, which have been attributed to degeneration of the pyramidal tract, and looked upon as an inevitable complication of certain cases of hemiplegia. The patient has exaggerated tendon reflexes and sometimes a little clonus, but the passive movements remain free and the return to active movements is thereby very greatly facilitated. When the treatment is discontinued for some days, there is then a marked tendency to contraction. If contraction has already taken place when treatment is begun, it is gradually decreased, and with this are also lessened formication, cramp, and the spasmodic momentary immobilisation of the foot or hand in involuntary positions.

The great drawback of this treatment is that it takes time, and must be minutely carried out, demanding some months of daily attention and a

great deal of finger-work. On some days rest is necessary, but, if the amount of exercise given is allowed to regress instead of progressing methodically, the pains will reappear and the contractions start afresh.

In a certain proportion of cases, voluntary movements can be obtained chiefly in the lower limb, because in hemiplegia, as in sudden affections of the nervous system, the functional symptoms at first go much beyond the extent of the lesion itself. What, in most cases, makes return impossible, is certainly the immobility induced in the muscles by contractions, pains and adhesions. By keeping the joints supple, and the muscles in relatively good condition, and by exercising the patient prudently in progressive voluntary movements, it is possible to obtain, after a few months, a return of spontaneous movements, which sometimes are considerable in amount. (*Le Progrès médical.*)

A RING-TEST FOR ACETONE.

Lange, of Wiesbaden, describes, in the *Münchener medizinische Wochenschrift* No. 30, a method of testing for acetone, by which a coloured ring appears at the junction of the two layers of liquids used. A small crystal of glacial acetic acid is first added to the urine in a test-tube, and then some drops of a freshly-prepared solution of nitro-prusside of sodium. On to this mixture, a few c.c. of ammonia are carefully poured, so that they do not mix. If acetone is present in the urine, an intense violet ring appears at the junction of the two fluids.

Lange believes that this test is an improvement on Legal's, and more exact than that described by Le Nobel. With the latter, in which the same reagents are employed, only in a different order, it shares the great advantage over Legal's test by the use of ammonia in place of caustic soda, thus avoiding errors due to creatinin reaction. Creatinin is always more or less present in the urine, and the red colour, caused by this body in the presence of sodium nitro-prusside and caustic soda, is so intense, especially in urine from fever or mania cases, that the carmine-like colour of the acetone reaction is quite lost.

The ring-test has the great advantage over a generally-coloured test, inasmuch as the result is, to a certain extent, shown in concentrated form, and the test is, therefore, more delicate. It is sufficiently sensitive to show the presence of 1/400th per cent. of acetone.

TREATMENT OF TUBERCULOUS MENINGITIS.

Riebold writes on the curability of this disease, in the *Münchener medizinische Wochenschrift*. He remarks that the prognosis has always been, until a short time ago, looked upon as absolutely fatal, in spite of a few isolated observations of cure, in which, however, the actual presence of the disease has always been a moot point. In twelve years only four certain cases of cure, in this frequently-met-with disease, have been published. Among the curative measures recommended are, local bleeding, inunction of grey ointment, administration of creosote, or iodide of potash, etc., but these have hardly any effect at all upon the course of the disease. The actual seat of the disease can only be reached by lumbar puncture,

or such operations as trephining. It is, however, extremely improbable that one, or even several punctures, can produce any appreciable effect upon the evolution of the disease.

Theoretically, if the inflammation is not too extensive, or too intense, repeated lumbar punctures are able to keep the intra-cranial pressure down to a low level, and thus to prolong life, and possibly to facilitate a cure. A case in point, recorded by the author, happened in a girl of 16 years of age, in which the clinical diagnosis seemed to be beyond all question. Thirty tubercle bacilli were recognised in a small fibrinous flake from the fluid obtained by puncture. The patient completely recovered after 24 punctures had been made in 18 days, and by which 574 c.c. of cerebro-spinal fluid had been withdrawn. Guinea-pigs inoculated with the fluid developed tuberculous affections.

The influence of the lumbar puncture upon the course of the disease was most definite. After one of them, the condition, which had been very threatening, improved very distinctly, and led on to actual recovery. Riebold is convinced that this favourable progress is due to the daily punctures, which relieved the cerebral ventricles of the excessive pressure to which they were subjected.

With regard to the frequency of the punctures, it must not be forgotten that the cerebro-spinal fluid is reproduced with surprising quickness. So long as the pressure exceeded 25 to 30 c.m. of water, and still remained at 10 to 12 c.m. after withdrawal of 25 to 30 c.c. of fluid, it was necessary to puncture every day. It is also necessary to take account of the patient's general condition, of the presence of symptoms of compression, headache, etc. As soon as the fever disappeared, and the albumen in the fluid got less, it was possible to look forward to the decrease of the inflammatory exudation, and the punctures could then be made at longer intervals.

PHLYCTENULAR KERATITIS.

In the *Gazette des maladies infantiles*, Carra deals with this form of keratitis, which is at times so obstinate, and is chiefly met with in children. It is characterised by the appearance of a few bullæ on the surface of the cornea, which take from 20 to 30 days to develop; at the same time, there is intense photophobia and profuse lachrymation.

The prognosis is quite favourable in slight cases, but less hopeful in the average cases. When the phlyctenule is central as regards the cornea, it may remain a film, an opacity, or albugo, which, in later years, will, more or less, considerably lessen acuteness of vision, cause disuse of the eye, and finally bring about an objectionable cast or squint, which is especially unbecoming in girls. In more severe cases, perforation or loss of the globe may happen.

For treatment, emollients must be exclusively and continuously employed, such as hot fomentations impregnated with the following solution :—

℞. Cocain. Hydrochlor. (neutral) - - - gr. ½.
Acid. Borici - - - - - gr. x.
Aq. Destill. - - - - - - ʒi.
Misce. Fiat. lotio.

In place of this may be used a solution of Ext. Opii, 1 per 1000; of salicylic acid, 2 per 1000; or of carbolic acid, 5 per 1000.

Hot and slightly antiseptic fumigations by means of Lotence's apparatus are very useful, they produce more effect in children, because they are more easily applied and consequently more effectual.

Atropine is advised for relief of the pain, thus:—

℞. Atropiæ Sulph. - - - - - gr. ss.
Cocainæ Hydrochlor. - - - gr. ss.
Aq. Destill. - - - - - - ʒiij.
Misce. Fiant guttæ.

"Two drops every morning, or at most for four or five days running, morning and evening."

Lastly, a boracic antiseptic ointment covered with oiled silk and changed every four hours, and the use of this ointment:—

℞ Pulv. Acid. Boric. - - - - - gr. xv.
Iodoformi - - - - - gr. iv.
Vaselini - - - - - ʒj.
Misce. Fiat unguentum.

If there is too much itching, add to this ointment a little oxide of zinc.

At the same time, the lachrymal ducts must be attended to, by washing them out with Anel's syringe at least twice a week. In addition to these, the nose, mouth, ears, and hairy scalp of the child must be carefully inspected. General strengthening treatment must be instituted, and, it is useful for this purpose, to give phosphate of lime and iodine.

In severe cases with pannus, ulcers, and purulent abscesses, active measures must be put in force. The electric cautery is necessary and renders valuable assistance. Light, but frequently renewed, touches, with the actual cautery, can cut short a complication, and nearly always bring about a quick and complete cure.

FIBROLYSINE AND SCAR-TISSUE.

The softening effect of thiosinamine upon scars and newly-formed fibrous tissue is confirmed every day by fresh clinical observations. Recently an improved form of the drug has been introduced under the name of "fibrolysine." This is really a combination of thiosinamine with salicylate of soda, which is very easily dissolved, and of which hypodermic injections are absolutely painless.

Woltke reports, in a Russian journal, that, wishing to treat two suitable cases with fibrolysine, but not being able to procure it, he made use of the following:—

℞. Thiosinamin,
Sodii Salicylat. - - - - - - - āā ʒi.
Aq. Destill. - - - - - - ʒiss.
Misce.
To be kept in a black phial.

Injections of this solution, of twenty minims each, were made into the tissues surrounding the affected part. One case, so treated, was that of a knee affected with chronic synovitis of three years' standing, consecutive to puerperal metritis and phlegmasia dolens. The contracted joint caused

a considerable degree of lameness. After a month's treatment, the patient was able to walk without a limp. The second case was that of a man with a large scar, the result of a burn, involving the flexure of the elbow and immobilising the limb. After six injections, all the movements of the elbow-joint became perfectly free.

Weisselberg reports, in the *Münchener medizinische Wochenschrift*, a case of stricture of the gullet cured by fibrolysine. The patient, aged 22 years, had swallowed by misadventure some strong soda-lye, which caused extensive burns of the lips, tongue, and gullet. Dilatation by sounds was attempted, but was found very difficult. Injections of fibrolysine were given, every two or three days, under the skin of the back, and, after twenty of these, the upper strictures admitted the largest-sized sounds. Another obstruction was found at the level of the cardia, and would not admit the finest bougie. Food was swallowed only to be regurgitated. After thirty-nine injections, a fine sound was passed through the cardia, and, from that moment, rapid improvement was obtained. The patient's weight, which had dropped to 42 kilo. (under seven stones), quickly increased to 59 kilo. (over nine stones). The patient could eat without the least trouble. Fifty injections in all were given, none of which produced more than a twinge of pain, only two were followed by a minute abscess.

DYSPEPTIC ARRHYTHMIA IN MIDDLE AGE.

According to Huchard, one must be distrustful of tachycardia and arrhythmia in middle age, but this circumspect rule, nevertheless, admits of a certain number of exceptions, in which the disorder owes its origin to the nervous or dyspeptic condition of the patient. Arterio-sclerosis is certainly frequently met with, but, outside a certain age, it does not comprise the whole of the pathology. It is quite a mistake to recognise nothing but this affection, when it is so often a very different matter, and a question of simple nervous, or digestive troubles. The error in diagnosis entails an error in treatment, for the patient may be ordered iodides, and, if his arrhythmia arises from indigestion, it is easy to see that an improvement will be indefinitely postponed.

Arterial tension will at once reveal whether or no arterio-sclerosis is present; if such is the case, the tension will be high, equal to 18 to 20, but, if an arrhythmia of nervous origin is in being, low tension is found equal to 11 to 12. It is certain, however, that the indications furnished by the arterial tension are not always absolutely correct, the very best sphygmomanometers still possess a tendency to vary considerably in the readings. Thus, we have seen a patient suffering from cardiac arrhythmia consult two medical men, with a two hours' interval between the visits. The first, using Verdin's instrument, found a tension of 19, and diagnosed arterio-sclerosis; the second found a pressure only of 11, and certified to the absence of that affection. The latter was right. Potain's sphygmomanometer does not appear to allow such incongruous mistakes.

In the absence of an instrument, gauging the pulse by the pressure of the finger is quite sufficient, for we can feel quite well the difference between the hard tight pulse of hypertension, and the soft compressible pulse of hypotension. Auscultation gives some information, for nervous arrhythmia betrays itself by an irregularity in the heart's action, as marked as that met

with in arrhythmia due to a lesion. But the aortic second sound is often sharply accentuated, an usual symptom of hypertension, and which when associated with a hard pulse is full of significance. Other diagnostic factors are the course of the disease, and the relative value of the symptoms. The dyspeptic, with arrhythmia, has not the irregularity all the time, it disappears suddenly for several days, and returns as suddenly; but an arrhythmia, due to a lesion, is constant. Huchard has insisted upon the difficulty, often the impossibility, of restoring rhythmical action in certain heart affections arising from arterial troubles. Moreover, in dyspeptics, arrhythmia does not form the chief symptom, for it causes but little inconvenience, and is not accompanied by any sense of oppression. The patient's main complaint is indigestion, the tongue has the typical indigestion coating, and constipation is present. A. Robin considers arrhythmia to be specially connected with hyperchlorhydric dyspepsia. Such is certainly the case, but all neurotics are subject to this, independently of their disordered gastric secretion.

In lesional arrhythmia, on the other hand, appetite remains good, there is no constipation, and digestion goes on, as a rule, without any trouble.

Treatment in dyspeptic arrhythmia consists first of all in not making matters worse. Too many of these luckless folk have been taking iodides for some months. These must be stopped at once. Next, the patient must be reassured, by relieving his mind of the dread of arterio-sclerosis, and by holding out the prospect of a certain recovery.

When the tongue is coated and the bowels are constipated, the following quickly relieves matters:—

℞. Sodii Bicarb. - - - - - gr. xlv.
Sodii Sulph.
Sodii Phosph. - - - - - - āā ʒiss.
Sodii Chlorid. - - - - - - ʒss.

Misce. Fiat pulv. i. Mitte tales No. x.

Dissolve one powder in two pints of boiling water. On rising and at bedtime take a tumblerful of this warm, and half a tumblerful at 10 a.m., and also at 4 p.m. If the constipation persists, increase the doses at 10 a.m. and 4 p.m., or increase the amount of sulphate and phosphate of soda to ʒii.

The pains of indigestion will be relieved by the use of:—

℞. Sodii Bicarb.
Magnesiae - - - - - - āā gr. v.

Misce. Fiat pulv. i.

Take one after the midday meal, and again after the evening meal.

Dieting must be strictly enforced. No wine or tobacco may be used, and the amount of bread, of which these patients partake very largely, must be much reduced. After each meal, the patient must lie down at full length for three-quarters of an hour without sleeping. Some health resorts, Plombières in particular, suit these patients very well (*Journal des Praticiens*).

Reviews of Books.

NOTES ON NEW EDITIONS.

Text-Book of Anatomy. Edited by D. J. Cunningham, F.R.S., M.D., D.Sc., LL.D., D.C.L. Pp. 1309. London: Young J. Pentland.

The *Text-Book of Anatomy*, edited by Professor Cunningham, first published about three years ago, has had the success that was to be expected for a work so well adapted to the requirements of medical students and practitioners.

In this, the second edition, all sections have been improved by careful revision of the text, by additional figures, and by using colours more extensively.

The authors had introduced just sufficient embryology and morphology to enable the student to more thoroughly understand the normal human anatomy, and the significance of variations and abnormalities. It is commendable that this part of the work is well up to date.

The ætiology section has been greatly improved by omitting the lines indicating the attachment of muscles, and by the addition of many useful figures illustrating ossification.

The lymphatic system has been practically re-written, embodying the researches of Poirier and Gerota.

It is one of the best text-books of anatomy in the English language, is well written, well up to date, and will meet all the wants of students and practitioners of medicine and surgery.

Hand-Atlas of Human Anatomy. By Werner Spalteholz, Extraordinary Professor of Anatomy in the University of Leipzig. Edited and translated from the fourth German edition by Lewellys F. Barker, Professor of the Principles and Practice of Medicine, Johns Hopkins University, with a Preface by Franklin P. Mall, Professor of Anatomy in the Johns Hopkins University. In three volumes. Pp. 872. London: J. B. Lippincott Company. £2 2s. net for three volumes.

The present is the second edition, which has appeared in English, although four have appeared in German. This admirable atlas meets the requirements of the student who wants a true guide to help him in his dissections. The first volume deals with the bones, joints, and ligaments; the pictures of the bones are excellent, and the parts clearly indicated. The second volume deals with the regions, muscles, fasciæ, heart, and blood-vessels. The third volume contains an account of the viscera, brains, nerves, and sense organs. Many of the pictures are coloured, and, without exception, are the best we have had an opportunity of examining. The book can be confidently recommended to those reading for the higher examinations in anatomy, and who may have but limited opportunities of visiting the dissecting room, and of seeing the parts themselves.

Surgery, its Theory and Practice. By William Johnson Walsham, F.R.C.S. Eng., M.B. and C.M. Aberd.; and Walter George Spencer, M.S., M.B. (Lond.); F.R.C.S. Eng. Pp. 1261. London: J. & A. Churchill. 18s. net.

It was in 1881 that the late Mr. Walsham first published his well-known book entitled *Surgery, its Theory and Practice*. Since that date the work has been reissued with advantage to the profession seven times, and now we have the ninth edition before us, edited and brought up to date by Mr. W. G. Spencer. The book is deserving of the highest commendation, as we consider it to be one of the best and most complete of the smaller surgical manuals. Many alterations and additions have been made throughout the text in order to bring it up to date, some portions have been re-written and much matter, now obsolete, has been wisely omitted. There are altogether 620 illustrations, and 24 excellent skiagram plates. We can only add that we consider it to be an ideal book for examination purposes, and one that we can confidently recommend to senior medical students.

Genito-Urinary Surgery and Venereal Diseases. By J. William White, M.D., and Edward Martin, M.D. Illustrated with 300 engravings and 14 coloured plates. Pp. xxiv and 1002. Sixth Edition. London: J. B. Lippincott Company. 21s. net.

A book which has reached its sixth edition in the course of nine years, does not call for an extended notice, as its merits are well known and evidently appreciated. In this edition, new illustrations have been added, and some sections have been re-written, in order to bring the work up to date. A coloured plate of the Spirochæta pallida forms the frontispiece, but there is no detailed description of the organism, and no mention of it is made in the index. In the section devoted to prostatectomy, two pages are devoted to the supra-pubic operation, whilst several pages and many figures are devoted to the perineal operation. This is, of course, what one would expect, since, in America, the latter operation is much more extensively practised. Still, considering the importance of the question, and as the comparative merits of the two methods are not yet fully decided, a fuller discussion is indicated in a work of this type.

Notes on Surgery for Nurses. By Joseph Bell, M.D., F.R.C.S. Edin., Consulting Surgeon to the Royal Infirmary and to the Royal Edinburgh Hospital for Sick Children. Edinburgh: Oliver & Boyd; London: Simpkin, Marshall & Co., Ltd.

When a book reaches its sixth edition in the course of nine years, it needs but little commendation from the reviewers. The intrinsic merits, which have ensured success hitherto, will continue to do so. At the same time, we cannot pass by the new edition of *Notes on Surgery for Nurses* without very strongly recommending it both to nurses, and to those to whom are entrusted their training and management, and in doing so, we very especially call attention to the later chapters.

Chapters I. to IX. are notes of surgical lectures on the various stages and treatment of inflammation, wounds, burns, fractures, and tumours. Chapter X. contains most valuable instruction on "Special Operations,"

and ought to secure its aim, viz., "the intelligent nursing of certain important surgical cases and operations."

It also deals with operations from a patient's point of view, and the anxiety experienced by friends and relatives, showing how, by sympathy and tact, a nurse may allay anxiety, and help to bring about a successful issue. Chapter XI. enters fully into the surgical nursing of children, while Chapter XII., "General Advice to Nurses," has much that is most helpful to all, young and old, hospital and private nurses. In conclusion, the author states his views on the relation of the trained nurse to the profession and to the public.

Surgical Diseases of the Dog and Cat, with Chapters on Anæsthetics and Obstetrics. By FREDERICK T. G. HOBDAY, F.R.C.V.S., F.R.S.E.; Member of the Board of Examiners of the Royal College of Veterinary Surgeons, &c. Pp. xxiv and 366. London: Baillière, Tindall & Cox.

THIS is a second edition, revised and enlarged, of the author's *Canine and Feline Surgery*, which has been out of print for some time.

It is shown very clearly how much can be accomplished in the animal world by strict attention to aseptic conditions in practice.

The book is the outcome of considerable practical experience, and deals with the subject very clearly and fully; it should consequently prove of the utmost value to veterinary surgeons.

A System of Gynæcology. By many writers. Edited by T. C. ALLBUTT, M.D., F.R.S.; W. S. PLAYFAIR, M.D., F.R.C.P.; and T. W. EDEN, M.D., F.R.C.P. London: Macmillan & Co. 25s. net.

On its first appearance ten years ago, Allbutt and Playfair's *Gynæcology* was immediately recognised as a standard work, representative of British gynæcology. Since then much progress has been made in this subject, and we now welcome the second edition of this work. This edition maintains the general character of its predecessor. Several articles have been omitted altogether, others are included for the first time, whilst the remainder have been subjected to a thorough, and, in some instances, laborious revision, in order to bring them fully abreast of modern theory and practice. Thus the two chief surgical articles in the first division, viz., those on Ovariotomy and on Hysterectomy, are entirely new; the former from the able pen of Professor J. W. Taylor, the latter from that of Dr. Spencer. Among the best in the volume are the new articles on Chorion Epithelioma by Drs. Eden and Teacher, on Antisepsis and Asepsis in Relation to Gynæcological Surgery by Dr. Eden, and on Gonorrhœal Infection of the Female Pelvic Organs by Dr Hellier. Among the less successful attempts, on the other hand, is Dr. Haultain's article on Benign Growths of the Uterus, a particularly unfortunate section being that on Adenomyoma, a variety of neoplasm which was first brought to the notice of British gynæcologists by Taylor and Cameron. These tumours are inaccurately described as "the result of infiltration of the fibromyoma by glands from the endometrium," and the description is otherwise inadequate and misleading. Again, the description of the histology of the urethral caruncle is a reproduction of that contained

in the old edition. Williamson's recent and careful work on the subject being ignored.

Nevertheless, the present volume still faithfully represents the modern, if somewhat conservative, British gynæcological practice, for which conservatism the editors attempt to justify themselves by stating that "the lapse of ten years has left the conservative tendencies of British gynæcological practice unchanged."

We venture to believe that some, at least, of our more advanced workers will not be satisfied with this aspect of the subject, but will find their needs more adequately satisfied by the more modern and less conservative statement of gynæcological practice so excellently set forth, both verbally and pictorially, in the best of the recent American text-books on this subject.

Manual of Medicine. By THOMAS KIRKPATRICK MONRO, M.A., M.D., F.F.P.S.G., Professor of Medicine in St. Mungo's College. Pp. 1023. London: Baillière, Tindall & Cox. 15s. net.

THE second edition of this valuable work contains new articles which deal with tropical splenomegaly, trypanosomiasis and piroplasmosis. The book in this way is made to keep pace with the more recent advances in medical science. The present edition is consequently somewhat larger than its predecessor, and contains a few new illustrations. We observe, with satisfaction, that the figure showing the cortical centres on the lateral aspect of the left cerebral hemisphere, has been redrawn, so as to show, in accordance with present-day teaching, the motor areas of the cortex situated in front of the fissure of Rolando.

Heart Disease and Aneurysm of the Aorta, with special reference to Prognosis and Treatment. By Sir WILLIAM H. BROADBENT, Bart., K.C.V.O., M.D., F.R.S., etc., etc., and JOHN F. H. BROADBENT, M.A., M.D., F.R.C.P. Pp. xvi + 479. London: Baillière, Tindall & Cox. 12s. 6d. net.

THE first edition of this book, which was itself a reproduction of lectures on "Prognosis in Valvular Disease of the Heart," delivered before the Harveian Society in 1884, and of the Lumleian Lectures at the Royal College of Physicians on "Prognosis in Structural Diseases of the Heart," delivered in 1891, was published in 1897. The present edition, which is the fourth, has been for the most part rearranged by Dr. J. F. H. Broadbent, who has added valuable chapters on the Pulse, Disease of the Coronary Arteries, Bradycardia and Atheroma of the Aorta. Sir William H. Broadbent himself has added to the chapters on Angina Pectoris and Functional Affections of the Heart. The work is exceedingly well reproduced, and will be a valuable addition to the physician's library.

Applied Bacteriology. An Elementary Handbook for the Use of Students of Hygiene, Medical Officers of Health, and Analysts. Revised and edited by CRESACRE G. MOOR, M.A., Cantab., F.I.C., with the co-operation of RICHARD TANNER HEWLETT, M.D., F.R.C.P., D.P.H. London: Baillière, Tindall & Cox. Pp. 492. 12s. 6d. net.

THIS third edition of "Applied Bacteriology" is certainly one of the best elementary handbooks on Bacteriology which we have examined. It

has been especially written for senior students and medical men, and particularly for those, who require a practical acquaintance with the chief facts of Bacteriology and their application to public health, and we have no doubt that these will find the book most useful. The present edition has been practically rewritten, and brought up to date very largely by the help of a skilled Bacteriologist. The work is well illustrated throughout, and at the end of the volume there are eight good coloured plates.

Essentials of Bacteriology being a Concise and Systematic Introduction to the Study of Micro-organisms. By M. V. Ball, M.D., formerly Bacteriologist to St. Agnes' Hospital. Fifth Edition, thoroughly revised by Karl M. Vogel, M.D., Assistant in Pathology, College of Physicians and Surgeons, New York. London: Henry Kimpton. 4s. net.

Avoiding the question-and-answer style of the other volumes of the essentials series, this book sets forth very concisely as large an amount of the science of Bacteriology as can be contained within its restricted compass. The chief characteristics of an exceptionally large number of bacteria are given in tabular form. It is, however, conspicuously lacking in recent work. In the examination of water, for example, the total number of organisms is taken as the criterion of its purity, and no mention is made of MacConkey's medium, or that of Conradi and Drigalski for the isolation of bacillus coli communis, or the typhoid bacillus.

A Treatise on the Parasites and Parasitic Diseases of the Domesticated Animals. By L. G. Neumann, Professor of the National Veterinary School of Toulouse. Translated by George Fleming, C.B., LL.D., F.R.C.V.S., revised and edited by James MacQueen, F.R.C.V.S., Professor at the Royal Veterinary College, London. Pp. xvi and 697. London: Baillière, Tindall & Cox.

The second edition of this important standard work has been undertaken by no less an authority than Professor MacQueen, by whom it has been carefully revised and brought up to date. The editor expresses his indebtedness to Professor Neumann for valuable help in revision and correction, especially in the chapter dealing with the Dermatomycoses. The collection of the former foot-note references into a bibliography is an immense improvement, and, as this occupies over thirty pages, the alteration had become a necessity.

Artificial Feeding of Infants: the Properties of Artificial Food and the Diseases which arise from Faults of Diet in Early Life. By W. B. Cheadle, M.A., M.D. Cantab., F.R.C.P. Pp. 274 London: Smith, Elder & Co. 5s.

The sixth edition of this valuable book, which is very welcome, has been thoroughly revised and brought up to date by Dr. F. J. Poynton. The chief additions relate to the improved procedure in feeding young children at the outset, so as to ensure their safe establishment upon artificial food; the most recent and improved methods of treating cow's milk, so as to render the casein soft and easy of digestion; and the exact means of estimating the proportions of cream and other ingredients, which should be added to milk and water in order to bring the whole up to the standard

of human milk. We can heartily commend this book to general practitioners, who often have to instruct mothers and others as to the proper methods of feeding infants.

Hygiene of the Nursery, including the general Regimen and Feeding of Infants and Children, Massage, and the Domestic Management of the ordinary Emergencies of Early Life. By Louis Starr, M.D. Seventh Edition. Pp. 309. Crown 8vo. London: H. K. Lewis. 3s. 6d.

The seventh edition of this valuable little work has been carefully revised and amended, where necessary, in order to bring it up to date. Special attention has been paid to the chapter on "Food," and numerous and useful additions have been made to those on "Dietary" and "Emergencies." No better assistant to the family doctor could be found than a mother who has carefully studied Dr. Starr's little book. There is at the end of the book a comprehensive index, which renders a reference to any particular subject, dealt with, an easy matter.

On Means to the Prolongation of Life: Second and Enlarged Edition of a Lecture delivered before the Royal College of Physicians. By Sir Hermann Weber, M.D., F.R.C.P., Consulting Physician to the German Hospital, the National Hospital for Consumption, Ventnor, and the Mount Vernon Hospital for Consumption. London: John Bale, Sons & Danielsson, Ltd. 2s. 6d. net.

"Weighty words of wisdom" may be truly used as descriptive of the subject matter of this little book, and one cannot help, on carefully perusing it, coming to the conclusion that, if people generally would follow its teaching, the duration of human life might reasonably be raised to 100 years. The points upon which Dr. Weber very rightly lays stress in order to ensure what we commonly understand by a green old age, are, bodily exercise, moderation in food, drink, and physical enjoyment, living as much as possible in pure air, maintaining the resisting powers of the body, early retiring and rising, with a restriction of the hours of sleep, bodily ablutions daily, keeping the mental powers in a state of activity, and preserving an equable temper. To assist those who would like to more thoroughly investigate the subject, an excellent bibliography has been added, and there is an exhaustive index. We cannot help thinking that future editions would be rendered more useful if the subject matter were divided into sections.

A Handbook of Diseases of the Nose and Pharynx. By James B. Ball, M.D. (Lond.), Physician to the Department for Diseases of the Throat, Nose and Ear, West London Hospital. Pp. 388. London: Baillière, Tindall & Cox. 7s. 6d. net.

This book, which gives a very concise account of the diseases of the nose and its accessory sinuses, and the pharynx, has been especially written for medical practitioners and senior medical students. The fact that the work has reached the fifth edition proves its popularity, and to the fact that the author has succeeded in supplying a real need. It contains some seventy-eight illustrations, all of which are clearly reproduced, and which materially add to its usefulness.

Practical Prescribing and Dispensing, for Medical Students. By WILLIAM KIRKBY, some time Lecturer in Pharmacognosy in the Owens College, Manchester. Second Edition. Manchester: University Press.

THE usefulness of this indispensable little book has been extended by the incorporation, in this second edition, so far as possible, of the metric system of weights and measures, and by the addition of a chapter upon solubilities, with a view to assisting the student's acquaintance with the commoner classes of inorganic and organic remedies. No student should be without this book, and we venture to think that the country practitioner will find it a very useful addition to his desk, for "factory made" medicines are not always at hand, nor are they always the best in all circumstances.

The Extra Pharmacopœia of Martindale and Westcott. Pp. 1045. London: H. K. Lewis.

IT is now just two years since the eleventh edition of this well-known and extremely useful little book appeared. During that time the authors have been engaged upon this, the twelfth edition. Many new books have been consulted, and, as a result, about 250 new pages have been added. The book, however, remains so light and of such a suitable size that it may still be conveniently carried in the pocket of the physician.

Uric Acid. An Epitome of the Subject. By ALEXANDER HAIG, M.A., M.D. Oxon., F.R.C.P., Physician to the Metropolitan Hospital, and the Royal Hospital for Children and Women. Author of "Uric Acid as a Factor in the Causation of Disease," etc. Pp. 162. London: J. & A. Churchill.

THE low price at which this "Epitome" is issued, as well as the style in which it is written, is conclusive, and we may add obtrusive, evidence that the book is intended for popular consumption. In the preface, Dr. Haig reiterates his conviction that the views he has adopted and promulgated, with regard to uric acid, occupy an impregnable position, and he contemptuously brushes aside any statements controverting them. In the brochure itself, he proceeds to develop *coram populo* his contention that uric acid controls the circulation in the body, and thereby most of, if not all, the ills to which human flesh is heir. The result is a mass of perfervid statements which rival, in dogmatic assertion, the detailed information on the same subject teeming daily in the advertising columns of the lay press, by means of which certain preparations seek a bubble reputation.

Dr. Haig, with great temerity, we venture to think, confidently appeals to action and observation as the grounds for demonstrating the truth of his statements. Numbers of acute observers throughout the world, not mere test-tube pathologists, have not only failed to find any reason for supporting him, but endorse Dr. Luff's opinion that "uric acid is a harmless by-product of the human economy, which has been most shamefully exploited as a dangerous poison."

Notes by the Way.

The Future of the Medical Profession.

THE future of the medical profession is a question which continues to excite a good deal of attention among the public at the present time. The latest and perhaps the most authoritative contribution to the discussion comes from no less a person than the President of Harvard University, who naturally deals with the subject from a philosophical, rather than a merely professional or commercial, point of view. His remarks are, however, of deep interest to all who can detach themselves from the commonplace, and perhaps sordid, present and look ahead whither the stream of tendency is carrying us. At the opening of the new buildings of the Harvard Medical School, Dr. Charles W. Eliot (whose doctorate is legal, not medical) pointed out that there will always be crying need of the personal services of the physician and surgeon for individual sufferers; hence, whatever else medical education may provide in the future, it must give the best training for the practitioner who is to treat diseased or crippled human bodies, and give advice about the sudden and the chronic ills which afflict humanity. So much will be demanded of all medical schools; but they must do much more than this. Although the treatment of sick and injured persons has substantially improved, the death-rate in cities diminishes slowly, and the heavy economic losses which result from disease and premature death continue. Moreover, as the President points out, the improvement of treatment in hospitals and private practice has been accompanied by a great increase in the cost of treatment, so that the charges upon the community resulting from sickness and injuries have, within the last thirty years, rapidly risen, and these heavy charges are, after all, incurred for the palliation of evils already suffered, not for their prevention. Nowadays "untrammelled dissemination of noxious things has taken the place of centuries-long localisation, a localisation which sometimes secured checks, antidotes, or immunities." If civilised society is to endure under its new exposures and dangers, the medical profession must take up with new ardour the work of pre-

venting approaching disease in addition to the work of treating disease arrived. "The function of the nineteenth-century physician will continue, and indeed will become more effective through better knowledge of the forces which may be made to act upon his patient, both from within and from without; but another sort of physician will be at work in the twentieth century, preventing the access of epidemics, limiting them when they arrive, defending society against bad food and drink, and reducing to lowest term the manifold evils which result from the congestion of population."

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The Doctor as Apostle.

In the last number of THE PRACTITIONER we said that work in laboratories, and the supervision of sanitary arrangements in the dwelling and the town, are only a part of the functions of the doctor of the future, who must further be an active preacher of the gospel of health. We are glad to find that, on this point also, we are in agreement with the President of Harvard. Recent events, he says, have brought into strong light a new function of the medical profession, which is sure to be amplified and made more effective in the near future, that is to say, the function of teaching the people how diseases are caused and communicated, and how they are prevented. It is pointed out that to discharge this function properly requires in medical men the power of interesting exposition, with telling illustration and moving exhortation. In regard to this matter, we may be allowed again to deplore the attitude which the Scribes and Pharisees of the profession have taken up in regard to it. Like the obscurantist churchmen of old, they will not have the people educated. Their view is that medicine must be treated as a mystery, which only its priests may handle, and medical knowledge must be in the keeping of a sacerdotal caste. As we have pointed out over and over again, it is only by the gradual education of the public that great sanitary reforms are practicable, for the profession can do nothing without the co-operation of the people. But the people cannot co-operate unless they know how to do so, and this they cannot learn unless they are taught. Who is to instruct them but the doctors, whose very title means "teachers"? The people crave for knowledge, as is shown by

the eagerness with which medical topics are discussed in the papers. If they are discussed with little knowledge, the reason is that the people, getting no counsel from those who alone can supply it, seek it from lying oracles. "The hungry sheep look up and are not fed" because Smith is afraid that Jones will advertise his food as the best. And so the profession wraps itself in its own virtue, and lets people perish for lack of the knowledge which it is its duty to give them.

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How to Educate the Public.

BUT how, it may be asked, is the public to be educated to understand the aims of medicine and the methods by which it strives to compass them? The question is partly answered by President Eliot, who says that the medical school of the future must provide means of popular exposition concerning water supplies, foods, drinks, drugs, the parasitic causes of disease and their consequences in men, animals, and plants, and the ways in which communicable diseases are spread. "Medical museums should," he adds, "be arranged, in part, for the instruction of the public, and, with some suitable reservations, should be statedly open to the public. The medical schools should also provide popular lectures on medical subjects, and these lectures should be given without charge on days and at hours when working people can attend."

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An Order of Medical Preachers.

DR. ELIOT sums up his suggestions in the proposition that "selected physicians should become public preachers as well as private practitioners." We should prefer that the two functions of teaching and healing were separated. If the preacher is a practitioner also, he will always be open to the suspicion of advertising himself, and this would go far to destroy his success as a missionary. The preacher of the gospel of medicine should, in fact, be a specialist, and he should not only be chosen but most carefully trained for his work. If he speak with the tongue of men and angels, and have not knowledge, he will be nothing. On the other hand, if he cannot persuad , as well as inform, his mission will inevitably be a failure. He should be paid by the State and

by the municipalities and other public bodies that engage his services. Sir Victor Horsley recently suggested that lectures on temperance should be delivered by experts in various parts of the country, and a propaganda of the same kind in regard to vaccination was some time ago set on foot in Austria. What is now suggested is an extension of the plan to the whole field of medical science. We are convinced that if the idea here sketched of what may be called an Order of Medical Preachers could be realised, the ignorance and superstition that now hinder the acceptance of medical truths and foster quackery, would be gradually dissipated, and the profession would be seen by the public in its true light as the most potent agency, outside each man's own soul, making for efficiency, well-being, and righteousness.

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A Written Gospel.

Mr. Brudenell Carter, who also insists on the necessity of educating the public mind to a comprehension of the nature and aims of medicine, suggests that this should be done by means of a written gospel. In his book, *Doctors and their Work*, published two or three years ago, he says (p. 169):—

"About 40 years ago, at the time when the weekly journal, published by the British Medical Association and intended only for the perusal of its members, had touched a very low point of illiteracy and inefficiency, I urged upon the Association that this publication should be abandoned, and that its place should be taken by a quarterly journal of the highest class, calculated to stand on the same plane with the *Edinburgh* or the *Quarterly*, and addressed by the medical profession to the public. I suggested that there should be a named editor, of very high professional standing, who should not himself write, but should be confined to the proper editorial function of judging; and that all articles should be anonymous, so that no contributor should write with any indirect view to his own advancement. The function of the journal so conducted was to be the diffusion of information concerning all matters relating to medicine which were calculated to be of general interest, or to display the real character of the highest class of medical work; as well as to speak,

ex cathedra, upon the very large number of social questions relating to education, sanitation, dietetics, clothing, exercise, recreation, the training of the senses and physical powers, and other kindred subjects, which rested in the main upon physiology, that is to say, upon systematised knowledge of bodily function, and of which only those who possessed such knowledge could, by any possibility, be adequate exponents. I am, even now, fully convinced that such a journal, if it could be set on foot and appropriately sustained, would, in a few years, greatly modify the popular conceptions of medicine and of medical practitioners; that it would compel, by the force of an enlightened public opinion, very extensive changes in the range and in the conduct of medical education, whether preliminary or actual, and that it would strike a death-blow at quackery, whether rampant in the advertising columns of newspapers, or lying delicately concealed within the ranks of the profession itself. Forty years ago the fates were hostile to the enterprise, and they would probably be equally hostile to-day."

We agree that such a journal, if it could be set on foot, and *kept going*, might be very useful. But whether it would "compel" any changes in medical education or in anything else, appears to us very doubtful.

The public could not be compelled to read Mr. Carter's ideal journal, and, from his description, it would not be of a character likely to attract the average man whom it is intended to reach. Nor would it be at all easy to find an editor such as he postulates. Simple as it is, the medical mind seems to have a difficulty in grasping the notion that even the highest professional standing does not of itself make an editor, and a Great Panjandrum, who merely condescended to throw the ægis of his dignity over a journal, would eclipse rather than regulate whatever vital force it possessed.

* * * * *

Work and Fatigue.

A LITTLE time ago there was a discussion in the *Times* on the "gospel of recreation" in which several "eminent hands" took part. Like most controversies it wandered far from the original point in debate and lost itself in a quagmire of statistics about

the birth rate. A more practical contribution to the subject has since been made independently by Dr. Maurice de Fleury, of Paris. Writing in the *Revue*, he says with truth that the chief cause of fatigue is not work, but "pottering." Once the mind is fully concentrated on the matter in hand, the brain can work for a long time without exhaustion. But if one stops every few minutes to dally with something that seems more interesting, to smoke a cigarette, or to indulge in a "brown study," fatigue comes quickly. The cerebral circulation may be trained to adjust itself for work by regular habits, just as the stomach prepares itself for the digestive process as the customary meal-time comes round. Another safeguard against fatigue is to work without excitement or hustling. Exhaustion is in inverse ratio to the amount of useful work done. Intellectual, like manual, labour, and indeed all the acts of our life, causes fatigue only when it is "rare, unaccustomed, accidental and without result. Habit and training prevent nervous wear and tear." The effort of an idle man makes him, so to speak, sweat blood, and all to little or no purpose.

* * * * *

Competitions.

THE result of the competition for August is as follows:—The best essay was sent in by Dr. S. H. Bate, of Newington Green; and the winning cases by Dr. E. J. Claxton, of Liverpool. Cheques have accordingly been sent to these gentlemen.

* * * * *

ERRATUM.—Owing to a printer's error in our November issue, Dr. Gordon W. Fitzgerald, the writer of the article on "Prophylactic Treatment of Postpartum Hæmorrhage," was described as "late Master, Rotunda Hospital, Dublin." We are informed by Dr. Fitzgerald that the correct description should have been "late Senior Assistant to the Master, Rotunda Hospital, Dublin."

Practical Notes.

THE RECTAL MUCOUS MEMBRANE.—The mucous membrane of the rectum is much more vascular than that of the colon; it is also thicker and, owing chiefly to the looseness of the submucous tissue, is thrown into irregular rugæ when the rectum is empty. The folds, however, disappear when the bowel becomes distended. Glands of Lieberkuhn and nodules of lymphoid tissue are also present. Cunningham points out that the mucous membrane of the rectum presents a characteristic punctated appearance, which is due to the presence of a number of small rounded depressions. These rectal pits are tubular in form, and have an accumulation of lymphoid tissue at the bottom of each. The rectal valves, or the valves of Houston, are crescentic, shelf-like folds, which project into the rectum on its lateral aspects. They consist of the infolding of the mucous membrane, submucous tissue, and part of the muscular coat, and are produced by the projection, into the interior of the rectum, of the creases, which occur on the exterior, and which are due to the lateral inflections of the rectum. They are usually three in number, and can be seen by the aid of a rectal speculum. They may interfere with the introduction of an enema tube. The columns of Morgagni are permanent vertical folds of the mucous membrane of the anal canal, and are found in its upper and middle portions. These columns, which are separated by grooves, are formed by infoldings of the anal mucous membrane, and usually contain some unstriped muscle, which is derived from the muscularis mucosæ, and often an artery and a vein. The submucous tissue of the rectum and anal canal is extremely loose, which, of course, permits free movement of the mucous membrane upon the muscular coat, and which only too readily allows of a prolapse of the mucous membrane through the anus (prolapsus ani). The hæmorrhoidal plexus of veins is situated in the submucous tissue.

THE HÆMORRHOIDAL VEINS.—Around the rectum and anus are two hæmorrhoidal plexuses, namely, the internal hæmorrhoidal plexus and the external hæmorrhoidal plexus. These, as well as the hæmorrhoidal veins, have no valves. The internal hæmorrhoidal plexus, which is placed in the submucous tissue, commences in the small anal veins at the margin of the anus. The anal veins run upwards in the columns of Morgagni, where they sometimes form ampullary enlargements, which are said to be the starting points of hæmorrhoids. These anal veins form plexuses, and then unite to form veins, which go through the muscular coat of the rectum about its middle, and then join the superior hæmorrhoidal vein. In its lower part the internal hæmorrhoidal plexus gives rise to small veins, which *pierce* the external sphincter ani to pass to the venous plexus, from which the inferior hæmorrhoidal veins arise. The veins, which pass through the wall of the rectum, unite to form the external hæmorrhoidal plexus, in which the three hæmorrhoidal veins commence. The inferior hæmorrhoidal vein runs into the internal pudic vein, the middle hæmorrhoidal vein joins the anterior division of the internal iliac vein, and the superior hæmorrhoidal vein joins the inferior mesenteric, which helps to form the portal vein. It will hence be seen that, on the wall of the rectum, there is a free anastomosis between the veins of the portal and systemic circulations.

—

HÆMORRHOIDS.—When considering the treatment of piles, it is important to remember the various causes of the dilated hæmorrhoidal veins, the walls of which later become fibroid and thickened. There may be a hereditary predisposition to hæmorrhoids, as may be ascertained by inquiring into the history of parents with regard to hæmorrhoids; at the same time the patient may be affected with varicose veins of the legs, or varicocele. The next point to consider is whether there is a possibility of there being a local cause in the rectum itself, such as chronic constipation, malignant disease of the rectum, or simple or specific stricture of the wall of the sigmoid, or rectum, such follow local syphilitic or tuberculosis ulcerations. There may be pelvic swellings, such as a gravid

uterus, fibroids of the uterus, or large ovarian cysts, which press upon the wall of the bowel and interfere with the normal venous return. Chronic enlargement of the prostate and stone in the bladder also predispose to the development of piles. In the next place it is important to consider the various conditions, which bring about passive congestion of the portal system, and hence obstruct the return flow of blood from the hæmorrhoidal veins, such as the various forms of cirrhosis of the liver, but particularly that form known as chronic atrophic cirrhosis, brought about chiefly by the abuse of spirits, the nutmeg liver, due to back pressure, which causes passive congestion of the intra-lobular veins in the middle of the lobules of the liver, brought about by chronic endocarditis and broken compensation of the heart, or due to chronic lung disease, such as chronic interstitial pneumonia and chronic bronchitis with emphysema. Lastly, it is necessary to enquire into the previous use of purgatives, especially aloes. Mitchell Bruce states that aloes as a purgative is peculiar in *acting chiefly upon the colon*. It is the slowest of all purgatives in its action. The pelvic circulation generally, as well as that of the rectum, is excited by aloes, which may cause hæmorrhoids and hæmorrhage from the bowel, increased uterine activity, menstruation, possibly menorrhagia, and even abortion. It must also be remembered that aloes is an ingredient in almost all the compound pills, which are in ordinary use for habitual constipation.

In treating hæmorrhoids, it is important, so far as possible, to remove all sources of venous congestion, such as rich living and alcoholic stimulants, and to regulate the bowels. This may be done by ordering mild aperients, such as Confectio Sennæ, or Confectio Sulphuris. The following cascara mixture for habitual constipation, recommended by Whitla, may be tried :—

R. Extracti Cascaræ Sagradæ Liq. - -	ʒij.
Tincturæ Nucis Vomicæ - -	ʒiij.
Tincturæ Belladonnæ - - -	ʒiij.
Glycerini - - - -	ʒiv.

Misce. Ft. Mist.

A teaspoonful to be taken night and morning for four days, then at night only.

Or the following:—

℞. Extracti Cascaræ Sagradæ Liq. - ♏xxv.
Syrupi Zingiberis - - - - ♏xxv.
Aq. Cinnamomi - - ad ℥j.
Misce. Ft. Mist.

Two tablespoonfuls to be taken three times daily.

Or the following laxative tonic is useful:—

℞. Extracti Cascaræ Liq. - - ♏xx.
Extracti Glycyrrhizæ Liq. - - ♏xxv.
Spiritus Ammon. Aromat. - - ♏x.
Aq. Carui. - - - ad ℥j.
Misce. Ft. Mist.

Two tablespoonfuls to be taken every night.

The local palliative treatment of piles consists in protecting the parts from injury and cold, using only cotton wool, or very soft paper, after defæcation.

Unguentum Gallæ c̄ Opio may be applied locally, but the following ointment is, as a rule, more efficacious:—

℞. Extracti Hamamelidis Liq. - - ℥ij.
Cocainæ Hydrochloridi - - - gr. x.
Adipis Præparatæ - - - - ℥j.
Adipis Lanæ - - - ℥ij.
Ft. Ung.

Or the injection of a hazeline lotion of the strength of 1 part in 8 is often found to be beneficial.

Should the hæmorrhoids become inflamed, the patient should at once be ordered to bed; the buttocks must then be raised, and hot boric acid fomentations applied. The pain may be relieved by introducing a morphia suppository into the rectum. Occasionally, after an attack of inflammation, or, as it is sometimes described, "an attack of piles," the varicose hæmorrhoidal veins become thrombosed, the blood clot may then organise and spontaneous cure result. It must be borne in mind, however, that large internal piles usually resist palliative measures, then more radical treatment should be resorted to; otherwise the internal piles may become extended through the anal orifice, and then strangulation, followed by sloughing, is very liable to ensue. Septic pylephlebitis may follow in due course.

Acute Rheumatism.—In considering the treatment of acute rheumatism, it is of the utmost importance to lay stress upon the clothing of the patient. The bed gown should be made of good flannel, and may be opened down the front and along the outer portion of the sleeves. He should be between blankets, which prevents the unpleasant clamminess, following the profuse sweating, which so frequently occurs. It has been stated by Chambers that there is less liability for the patient to suffer from endocardial and pericardial lesions, when he is surrounded by woollen clothing. Osler suggests that the most suitable diet is milk, which may be conveniently diluted with alkaline mineral waters. Lemonade, barley water, and oatmeal water may be freely given. It is best to give small quantities of food at short intervals. Local treatment of the involved joints is important. The affected joints may be wrapped in cotton wool, and then steadied by a nicely padded splint, without using undue pressure over the joint by a bandage. If there is much pain in the joints, hot lint, steeped in Fuller's lotion, may be useful as a measure of relief. The composition of the lotion is as follows: Sodii Carbonas, ʒvj. Tinctura Opii, ʒi. Glycerinum, ʒij. Aqua, ʒix. With regard to the internal use of drugs, perhaps the best results are obtained by the administration of the Salicyl compounds. Salicin, which is said to be less depressing than sodium salicylate, may be given in doses of 20 grains every two hours until the pain is relieved. Salicylic acid, in doses of 20 grains, may also be given every two hours, until the pain is relieved. Osler recommends that it should be administered in capsules. For adults, sodium salicylate in 20-grain doses every two hours, until the pain is relieved, is found to be satisfactory. The following prescription will be found to be useful:—

℞ Sodii Salicylatis - - - - gr. xx.
Potassii Bicarbonatis - - - - gr. xx.
Liquoris Morphini Hydrochloridi - ♏v.
Aq. Chloroformi - - ad ʒi.
Misce. Ft. Mist.

Two tablespoonfuls to be taken every two hours, until

the pain is relieved, and then every four hours, until the temperature of the patient begins to fall towards normal.

Dover's powder, given at night, is extremely useful for relieving pain and procuring quiet sleep.

"MASSIVE DOSES OF THE SALICYLATES."— In the *American Journal of the Medical Sciences* for September 1906, there is an instructive article, by T. W. Clarke, on "the value of massive doses of the salicylates in the diagnosis and treatment of acute articular rheumatism." He says that he usually begins the treatment of acute articular rheumatism by giving 10 grains of sodium salicylate every two hours, or 15 grains every three hours, and the amount has been increased to 15 grains, in some cases to 20 grains, hourly, so as to obtain the effect of the drug as quickly as possible. The routine method consists in giving the patient 10 to 20 grains every hour, until toxic symptoms, such as deafness and tinnitus aurium appear. The use of the drug is then suspended, but resumed when these toxic symptoms disappear. It is then given in 10 or 20 grain doses every two to four hours, but again stopped directly the toxic symptoms, already mentioned, reappear. The average amount of sodium salicylate, required to produce the full effect of it, is found to be about 200 grains. These large doses are said to be well borne, and, as a rule, there is no nausea, vomiting, or depression following them. The effect of this sudden saturation with the drug is to produce a rapid fall of the patient's temperature to the normal level. Pain is quickly relieved, so that, by the second day, it will probably have entirely disappeared. The swelling may persist in a mild degree for a few days, but, as a rule, it rapidly subsides. Cardiac complications are said to be lessened by this method of treatment, and no cardiac depression has been observed, the pulse-beat usually drops to 70 or 80 per minute within three days. Clarke says, "The main objection to the use of the massive doses is the difficulty experienced in keeping the patients at rest, after the first three days. Feeling comfortable, and, as they express it, cured, most of the unintelligent public-ward patients can see no reason for

remaining in bed, and clamour to go to their homes to work, and it is often hard or impossible to keep them on their backs for the three weeks since the last symptoms have disappeared, a procedure which has seemed advisable."

The administration of large doses of sodium salicylate has been used for diagnostic purposes, in order to differentiate between cases of acute rheumatism and other forms of infective arthritis, such as acute gonorrhœal arthritis and acute polyarticular osteoarthritis. It is found that, in acute rheumatism, the patient can tolerate from 150 to 300 grains without toxic symptoms appearing, and the fever, swelling of the joints, and the pain all disappear in about three days.

In cases of acute gonorrhœal arthritis, it was found by Clarke that toxic symptoms appeared after about 130 grains of sodium salicylate had been administered. While the temperature may become normal and the pain less, the swelling of the joint, or joints, remains, and, as soon as the toxic symptoms of the sodium salicylate disappear, the pain returns. After repeated observation of patients suffering from acute rheumatism, and treated with large doses of sodium salicylate, Clarke comes to the following conclusions:—1. Sodium salicylate can and should be given in much larger doses than are generally used. 2. Given in massive doses, it reduces the fever, relieves the pain and swelling, and shortens the course of the disease. 3. It is not injurious to the heart, and appears, by quickly cutting off the disease, to offer some protection to that organ. 4. The patient's tolerance of the drug, and the rapid cessation of symptoms, form valuable therapeutic tests for the diagnosis of acute articular rheumatism.

Preparations, Inventions, etc.

ANASARCIN.

(The Anasarcin Chemical Co., Winchester, Tennessee.)
(Messrs. T. Christy & Co., Old Swan Lane, E.C.)

Anasarcin may be obtained in two forms, in tablets, or as an elixir. It is strictly an eth-pharmacal preparation, and is a combination of the active principles of oxydendron arboreum, sambucus canadensis, and arginea scilla. Its action is to restore physiological balance between the arterial and venous systems, whether disturbance of that balance is due to derangements of the liver, kidneys, or heart; in other words, regulation of blood pressure through control of heart action is the essential part of treatment for dropsy. It has been found that anasarcin controls heart action by stimulating the cardiac motor ganglia through the cardiac plexus of the sympathetic system, and, at the same time, inhibits the cardiac fibres of the pneumogastric, thereby dilating the arterioles and increasing systolic force, both of which effects favour resorption and elimination of the effused serum. Its value in affording relief and effecting cure in cases of dropsy is widely recognised.

WRIGHT'S COAL-TAR INHALER AND VAPORISER.

(Messrs. Wright, Layman and Umney, Ltd., Southwark Street.)

An exceedingly simple and ingenious plan for the preparation and diffusion of coal-tar vapour in diseases of the respiratory system is to be found in Wright's Coal-tar Inhaler and Vaporiser. It consists of a small metal vessel, furnished with a lid, through an aperture of which the vapour for inhalation or diffusion can issue. In the upper compartment of the vessel an absorbent block saturated with the coal-tar liquid is placed. The lower contains a night-light, which gives off sufficient heat to convert the moisture above into vapour. The whole arrangement is neatly packed in a cardboard box, and can be obtained at a small cost. We have personally tested the apparatus and can strongly recommend its adoption.

PROTENE ARROWROOT.

(The Protene Co., Ltd., Welbeck Street, London, W.)

On previous occasions, we have referred to the excellent and useful preparations of the Protene Company, and drawn attention to the value of protene as a food. We have now before us another preparation, recently introduced, in the shape of protene arrowroot. This forms an ideal food as, in addition to the useful properties of arrowroot, it contains protene, the nutritive element of pure fresh English milk. It should be used in exactly the same way as ordinary arrowroot, and, from its composition, is invaluable in cases of diarrhœa, dysentery, and other intestinal disorders.

NEW PREPARATIONS BY

(Frederick Stearns & Co., Detroit, Michigan, U.S.A.)

(Messrs. T. Christy & Co., Old Swan Lane, E.C.)

Adnephrin Solution.—This is a stable and sterile solution of adnephrin in physiological salt solution, containing one-half of one per cent. of methaform, and is a powerful astringent and hæmostatic, as well as a remarkable heart stimulant. On account of its powerful local vasoconstrictor action, it is of great value for controlling hæmorrhage. It will be found useful in epistaxis, hæmoptysis, hæmatemesis, menorrhagia, postpartum hæmorrhage, hæmaturia and other forms of hæmorrhage, and, with proper precautions, may be used hypodermically and intravenously.

Alphogen is a powerful germicide, but non-poisonous and non-injurious to animal tissues, and, being an organic peroxide, has all the valuable qualities of hydrogen peroxide but none of its undesirable properties. It is indicted in all infections, in which a germicide can be brought into contact with the pathogenic micro-organisms present. The records of its germicide action are exceedingly satisfactory.

Methyloids.—These are an improved combination of methylene blue, Santal oil, copaiba, Haarlem oil, and cinnamon oil, and are supplied in capsoid form for the treatment of gonorrhœa and its complications, and cases in which a urinary antiseptic is indicated. They are convenient to carry, and to take, and are readily soluble, and the ingredients are protected from deterioration. The dosage is accurate.

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